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Lower Prices Expected

Buying of Steel Products Falls Off Sharply

Bar Iron Lower—Pig Iron Buyers Holding Aloof

The expectation of lower prices is to-day the dominating influence in iron and steel markets. The meetings held last week by the manufacturers in various lines appear to have increased the confidence of buyers that a lower level will soon be reached, either by co-operation or through an open market as in February, 1909. As a result business has fallen off sharply, and the week has brought further restriction in output of blast furnaces, steel works and rolling mills. The industry will go into the new year at a pace much below that at the opening of the month.

The United States Steel Corporation is now operating 50 per cent. of its blast furnace capacity, and will put out other furnaces before the end of the year, including two in Alabama. Other steel companies are also making less pig iron.

The pig iron market, which has been free from any effort by producers to co-operate, is nearer to a standstill than finished materials. Southern iron is freely offered at $11, at furnace, for No. 2 for the first half of 1911, but foundry buyers seem even more disposed to wait than before.

Philadelphia reports a sale of 6000 tons of iron of pipe grades. Eastern pipe makers are still in the market for about 10,000 tons.

In the Chicago district the competition of Mahoning and Shenango Valley irons is more pronounced. A movement has been on foot to combine a number of the merchant Valley furnaces, but with no immediate prospect of success.

The low prices lately made on bar iron, particularly in the Chicago district, have given the iron rolling mills business at the expense of those rolling steel bars. At 1.30c., Pittsburgh, iron bars are $2 a ton below the co-operative price of the steel bar mills, and there has been some shading of 1.30c. Railroads have been larger buyers of bar iron for new car work and repairs.

For the battleship Texas, which is to be built at Newport News, the Carnegie Steel Company will furnish 13,000 tons of plates and shapes; of armor plate, 6000 tons will be required. Worth Brothers were low bidders on the plates for the other battleship, to be built at the Brooklyn Navy Yard, and on which work is held up.

Fabricating companies are making deeper cuts, extraordinary figures being reported on recent lettings of railroad bridge work. It is estimated that 300,000 tons of steel will be required for bridges and buildings now being figured on, 70,000 tons of this amount coming up at Chicago. The record of 1910 in structural steel, with an estimated total of 1,200,000 tons in

lettings of large work, was exceeded both in 1909 and 1906.

Rail orders include 5100 tons for the Mexico Northwestern Railway and 6700 tons for the Pittsburgh & Shawmut. The Chesapeake & Ohio has inquired for 15,000 tons and the Baltimore & Ohio will buy 40,000 tons, as against 80,000 tons for this year. The Lackawanna is in the market for 5000 tons of bars and track supplies and the Chesapeake & Ohio has closed for 3500 tons.

Demand for light rails has fallen off and business has been done at lower prices in the past week.

Cars bought in the past 10 days and those called for in new inquiries represent a total of 10,000 to 12,000, and the outlook for winter work at the car shops is somewhat better.

A Canadian shipyard has taken 2500 tons of plates, and for Canadian car, locomotive and repair work contracts placed at Pittsburgh aggregate 20,000 tons.

While sheet prices are being better maintained since the Pittsburgh meeting, new demand is quite unsatisfactory. The leading producer is running at about 50 per cent. of capacity, and some of the independent companies are doing a little more than that.

The most interesting feature in old material is the development of an export demand. Arrangements are being made for the export of several thousand tons of steel melting scrap to Italy, the price offered being somewhat above that prevailing for domestic business.

A few lots of old range Lake Superior ores have been reserved for next year by furnace companies, the price to be that fixed later on 1911 contracts. General ore buying will be very late next year.

Prices of Steel Products

The question what is the right price for steel products is again being agitated—the price at which there will be the largest buying and the largest employment of producing capacity and consequently of labor, at a profit to the manufacturer. We assume that this last qualification should be made, though in some quarters it has been ignored. The fact that steel manufacturers have lately been holding conferences on one product after another has given keen interest to the discussion, and the situation has been compared with that which existed before the open market declaration of February, 1909. Already advisers have come forward in articles similar to those which were frequent in the period of co-operation in 1908, pointing out that the policy of "reducing output and maintaining prices" results in idleness of many workmen and asserting that if prices were lowered, more steel would be bought and more men would be employed.

The argument seems to be that since the manufacturers of steel have been attempting by co-operation to modify the conditions usually found in times of declining demand, they should be held responsible for all features of a situation like the present. Critics of the price maintenance policy of 1908 often charged upon it the delay of improvement. Curiously enough, too, ever since the turn in February, 1910, from the expansive movement in iron and steel that had lasted just a year, many have risen up to say that the start was made too soon after the panic and must now be atoned for in a real readjustment. Evidently those who would guide the destinies of the steel trade will find it hard to suit the economists.

It is so far the habit to think of the steel trade as determining conditions, that it is often forgotten that it is affected by influences which bear upon all industries. Again, there is a certain popular demand that the steel trade perform the extraordinary. If there is not a boom market, with mills oversold and consumers pushing up prices on each other by buying for the future, there must be the weekly expectation of a "break" in the market, with prices crowded to sensationally low levels to stimulate demand. A waiting market or an orderly adjustment in a time of declining consumption somehow cannot be tolerated.

Looking back upon the course of the steel market in 1908, it now appears that too much stress was laid upon what the manufacturers did. Certain consequences of the panic were there, that could not be cured by any action on steel prices to put them up or down.

The disposition now is to use the experience of 1909 to point the way out of the present situation. Predictions are already made that the new year will only be well entered upon when action similar to that of February, 1909, will be taken; or, if the present status does not give way to a thoroughly competitive market, that the manufacturers will co-operate on a lower level of prices. Leaving out of the account the conditions now affecting railroad demand, the pending prosecutions of large corporations and the expectations of tariff readjustment by the opponents of protection, there are three important differences between early 1909 and now. These relate to the steel trade itself. In the first place the financial position of the steel companies is much stronger than it was at the opening of 1909, and there is not as great anxiety to get business. The second difference is that then the country was bare of steel after 15 months of stock consumption and was ready to stock up again at low prices. To-day, after a year of record shipments of steel from the mills—in the aggregate, though not in each individual line—the country is again falling back on stocks, but is not yet in any such condition of stock liquidation as it was two years ago. In the third place the gap between selling prices of finished material and the cost of raw materials and labor is less now than at the close of 1908. Without discussing now the probable consumption of steel in the first half of 1911, the above conditions account in large part for the apparent unwillingness of manufacturers to cut prices further at this time.

Developments in the next month or two months will have much to do with prices for the first half of 1911. It is obvious that co-operation will be most successfully maintained on a comparatively low level of prices. It is also the fact that a sentiment exists among some manufacturers of steel, favorable to continued co-operation, though at a lower level than to-day's rather than try conclusions in a general scramble for business. There is in this feeling a well-grounded distrust of the ability of the country to repeat the splendid performance following the cuts of last year.

But entirely apart from what manufacturers plan, the final reckoning must be with the buyer, and conditions are admittedly working in his favor. It is apt to be overlooked that even under a 50 per cent. operation of mills as the year closes and the railroads all economizing on steel, the consumption of pig iron is still above a 20,000,000-ton rate. At the same time the outstanding fact to the buyer of steel is that prices

are still some distance above the buying level of 1909, and have responded little as yet to the demand made at the polls last month for a downward revision in all lines.

The Menace of a General Tariff Revision

Extremists favoring very low tariff duties or absolute free trade are, of course, heartily in favor of tariff revision at any time and under any circumstances. They can be expected to be enthusiastic supporters of the announced determination of Democratic leaders in the House of Representatives to begin an investigation as soon as the present Congress adjourns for the purpose of securing information upon which to base a revision of the tariff when the new Congress convenes next December. The announcement of this purpose, however, is most unwelcome, both to stand pat protectionists and to those who would like to see some of the present tariff schedules revised. The country generally has not felt seriously alarmed over the possibility that some of the schedules might be taken up separately and lower duties named on articles therein classified. This is a matter which was not thought to be specially disturbing, although it would, of course, retard trade for a time in the commodities on which new duties were under consideration. The dissatisfaction with the Payne-Aldrich Tariff act is by no means general, but applies simply to a few schedules. It had been expected, however, that the revision of even these schedules would not be attempted until the Tariff Board had had an opportunity to complete its investigations now under way, and report the facts to the President as a basis upon which to make a revision.

The whole situation has been changed by the announcement of the Democratic leaders. It is but a short time since the business of the country was seriously interfered with by a general tariff revision, and now it is confronted with the expectation of another long drawn out period of waiting for the action of the Congress which meets next December, and the result of which will not be known until well along in the summer of 1912. It is a rather unpromising prospect for the next year and a half. It will unquestionably have the effect of further halting new enterprise and perhaps seriously dislocating our industries by retarding their return to at least normal activity which under other circumstances might have been expected some time in the coming year.

Another effect of the suppressed trade caused by such a prolonged tariff agitation would be the inevitable appearance of an abnormally heavy buying movement after the settlement of the matter in 1912. It has always been the experience of this country that after a long period of enforced business quietude our pent-up activities have burst forth in tremendous energy with buyers rushing into the market for the purpose of covering their long needed requirements and thus precipitating a demand beyond the ability of the country to meet immediately and thereby causing prices to rise unnaturally. If there is anything this country imperatively needs, it is to be relieved from the alternation of periods of severe depression with times of feverish activity. Hardly any other country can be found which is subject to such extremes in this respect as the United States. We are now experiencing the evil effect of just such a period of excessive activity. It caused us to overbuild in making additions to our blast furnace and steel works capacity, and the depression through which we are passing is made much more severe by the overshadowing productive capacity now idle. The country imperatively needs a rest from governmental interference with business. No general tariff revision is desired by the great majority of the people. The revision of a very few schedules of the present tariff is all that should be attempted.

Savings in Machine Maintenance

In a paper read at the recent meeting of the National Machine Tool Builders' Association, by C. K. Lassiter, mechanical superintendent of the American Locomotive Company, on "The Design and Construction of Machine Tools From the User's Standpoint," suggestions of live interest were made concerning the maintenance of equipment. In most machine shops no very exact knowledge exists of the condition of machinery. The factory management has a general idea of the equipment, but system is lacking. According to Mr. Lassiter's experience, great economics must follow the consistent carrying out of such a system. For several years he has given specialized attention to the duties of caring for and maintaining equipment in the American Locomotive Company's several plants. Under an organization, which sub-divides the work, enormous and almost inconceivable savings have been achieved in the cost of maintenance. At the same time the productive machine hours which are lost, due to failures, have been reduced from 12 to 1¼ per cent. When the system was first installed about 1000 of the 9000 machines of the company averaged to be out of service. The figure now stands at 100.

As a part of the organized department each plant has an inspector of equipment whose duties are to investigate and report all conditions which might tend to cause machine failures, or which might cause accidents to employees, and to report abuse of equipment by operators, and equipment not kept clean or in order by operators. Weekly reports classify failures of machinery as due to negligence, improper design, accident and ordinary wear. Immediate effort is made to correct the condition which has rendered a machine idle. Where the design is at fault, the weak parts are redesigned and strengthened. As to failures from ordinary wear, investigations are constantly in progress in the effort to simplify the construction of the machine and reduce the number of parts to a minimum. Some of the results cited by Mr. Lassiter illustrate the working of the system:

> In one of our shops, by referring to our reports, we found that 40 per cent. of the failures were due to negligence. We were able to reduce this item to 1¼ per cent. In another case we found that we were purchasing a certain machine from some of the machine tool builders, and there was an error in design which had existed for 10 years on this machine, which was costing us something like $5000 per year. We took the matter up with the machine tool builder and had the design changed. This charge was eliminated, which was like picking up so much money.
>
> We found that the maintenance on some machines which we had in service was so heavy that we could not afford to keep the machine in service, and we replaced them with modern tools. This also showed a decrease in maintenance.

The effect of the system on the design of machine tools used by the company is suggestive:

> Most of the tools which we purchase for our works at present are built to specifications prepared by ourselves, and it is our aim to cut out every gear or moving part on all

machines which is not actually needed for our class of work.

In specifying for planers we require only one speed, as our work is so extensive that we can afford to put a planer on one class of work and never change it.

On vertical milling machines we have specified the design so as to have but one pair of gears between the motor and the cutting tool.

On large vertical boring mills we have cut out gear boxes and equipped the drive with a big plain pulley and placed a variable speed motor on the ceiling, where the countershaft had formerly been put.

On radial drills we have lowered the speed of the driving shafts and increased their diameter, to reduce the maintenance on bearings.

In this connection are the results of tests looking to the economical use of power in operating machines. Here is one example:

In testing out some of our machines we found that there was a considerable amount of power used for removing a certain amount of stock. A good deal of this power we found was absorbed through the friction of unnecessary gears. This is one reason why we have tried to cut out every gear possible on all of the machines which we purchase. It not only saves maintenance, but also cost of power to operate machines.

Few concerns are large enough to maintain a department such as this, but none is so small that the owner cannot work to advantage in careful, individual study of the various units of equipment. The effort must result in appreciable economics in a large majority of cases.

Correspondence

Efficiency the Criterion of a Wage Rate

To the Editor:—In conversation with some large employers of mechanics, I find that they are disposed to question the soundness of my conclusion that "the square deal is the visible sign of real intelligence upon the part of the employer in treatment of his men," and that "real intelligence requires that efficiency, and not the law of supply and demand, should be the criterion by which a wage rate should be determined." Perhaps, therefore, the citation of some instances in support of my conclusion may not be without interest to your readers. The instances I shall cite will all be in the same line of work, though in shops belonging to different owners.

VARIATIONS IN SHOPS DOING IDENTICAL WORK.

I have visited many shops doing identical work and in the line to which the incident I related in my letter to you of December 12 referred, where a superintendent cut a rate in half without remonstrance from the operator. A very suggestive fact which my visits disclosed was that, taking two shops where the equipment was practically identical in respect of the makers of a given tool and in respect of the modernness of the equipment, I found that on a given job there was a vast difference in respect of the piecework prices. In one instance a shop pays 28 cents, another pays 41 cents, and still another pays 70 cents for the same job.

Now, the 70-cent shop foreman claimed, first, that his work was done better—*i.e.*, with more finish; and second, that his men earned more per hour on the job. Conceding for argument's sake that he got a smoother finish, and that it was the result of a finishing cut (three instead of two), this would bring him down about to the 41-cent shop, perhaps. But an even more suggestive fact disclosed was that while the man who got 41 cents and the man who got 70 cents for the job earned more per hour, perhaps, than did the 28-cent man, their average per hour for the month was not quite so great as was that of the 28-cent man. This is, of course, tantamount to saying that the efficiency of the 28-cent man was much greater than that of the other two. But this again is only another way of demonstrating the difference in efficiency of the heads of the different shops.

FOREMEN NOT SO RESPONSIBLE AS HIGHER OFFICIALS.

Going still further back, or "higher up," we find that the credit or the demerit for this difference in results achieved by different shop officials on the same job rests in last solution with the official who has the appointing and removing of the shop officials in question in their respective shops. I have observed the manner in which this difference between "higher-ups" worked out in concrete shape in divers ways; but the ultimate result is almost uniformly the same. In effect the result discloses that, with several shop officials having about an equal knowledge of things mechanical in a given line of work, that shop official having over him the "squarest" (most really intelligent) higher-up will get his work done for the least money, while his men will average more per hour per month at the same time. And this is, of course, what all are striving for—at least the first half of the proposition. Perhaps if more attention was devoted to recognizing the intimate connection between the last half and the first half of the proposition the first half would be attained more often.

My experience has shown me that one reason why the higher piecework price has not increased the rate per hour per month earned by the operator is that, in practice if not in theory, he finds himself up against a gentle admonition from his foreman that he had better go a bit slow—that while the shop superintendent would be willing to have him make all he could he, the superintendent, fears that the boss would not allow the schedule to remain unaltered were he to find that his men averaged more than, say, 35 cents per hour; in other words, it seems to disclose that, *prima facie*, it is another case of Mr. Ignorant Flatrate's shadow hanging over the shop's reaching its best efficiency.

PIECEWORK SCHEDULES SHOULD BE MADE BY QUALIFIED MEN.

While this may be true on the surface, and to some extent in fact, the real explanation, as I have discovered to be the fact in many cases, is that the piecework schedule has been laid down by those who did not know their subject sufficiently to really qualify themselves for that most important duty in a piecework shop—*i.e.*, the preparation of a price schedule calculated to achieve highest efficiency for the shop—*i.e.*, greatest output per capita. A prerequisite to this is stability of the price schedule. And knowledge of what a day's work is, coupled with acknowledgment of the fact that the average man is, in respect of efficiency, only two-thirds of a man, is a condition precedent to a stable piecework schedule.

Naturally, I do not mean that a piecework schedule should be unalterable. Supplying the men with improved tools or appliances, as I showed in a previous letter, affords fair reason for reduction of a given schedule. Barring such changes, a piecework schedule should be stable, if highest efficiency be a desideratum. And it is a desideratum in any line in which raising of prices is the last, instead of the first, resort to be adopted. The sort of thing referred to in the previous paragraph is extremely likely to occur where the people charged with the framing up of a piecework schedule have been technically educated before they received their practical education. I do not see how, in fairness to them, anything else could or should be expected of them under such circumstances.

They obtain their practical education by "trying it on the dog" in such and in other ways—*i.e.*, by framing up piecework schedules. Of course, their owners pay a fearful price for the education of this class of shop officials, when one takes into consideration what a difference the lowering of the efficiency of a shop means in dollars and cents in one year.

PIECEWORK PRICE SHOULD BE BASED ON THE AVERAGE MAN.

In the instance I have cited, where one shop paid 70 cents as against 41 and 28 for the identical job in the other two shops, the head of the first shop had been educated so that his theoretical education had preceded any practical education whatever; and I am satisfied that, not knowing a real day's work, he had been betrayed into basing his price on the output, not of an

average (66 2-3 per cent.) man, but on that of a "soldier in the cause of a minimum day's work for a fair day's pay."

The head of the shop told me that the difference in price was due to a better grade of work and that the man earned 45 cents per hour. The man who did the work told me he did not know as to whether he put up more accurate or more finished work than was done in the other shops, but that he did know that "there was a dead line" of 35 cents per hour per month, which his foreman had tipped him off not to overrun. The foreman gave him the reason that the superintendent's superior would insist upon the superintendent revising the schedule "if anything better than a 35-cent rate per hour per month showed up as a steady diet." This man was corroborated by several others in the same shop; in fact, the existence of "a dead line" in that shop was common knowledge in that city. The reason therefor was no secret either.

I am convinced that the head of that shop meant right, but his blunder was due entirely to his being educated (for that job) "tail end first with care"; his superior, who confirmed that schedule, was educated along the same lines. The head of the shop was not big enough to take the back track, besides which he knew enough to fear the effect of cutting a rate. Perhaps he knows his superior and has reason to fear the effect upon his future of an admission of his error. Hence there seems to exist between them a community of interest in that particular brand of bliss which is often based upon educated ignorance.

TOO LOW A PIECEWORK PRICE.

I have, on the contrary, observed that a shop superintendent educated along deductive lines, where obtainment of practice precedes obtainment of theory, sometimes makes a mistake in the other direction, and makes a price which is too low. The consequences, however, are not nearly so great nor necessarily so enduring; and a man educated that way generally knows that the ability and disposition to take the back-track in such cases are a fair indication of a man's makeup, at least in respect of broadness.

I know of a case where a superintendent happened to make a rate on a given job without considering that the man doing that work was much more than an average 66 2-3 per cent. man; that he was, in fact, pretty close to a 100 per cent. man. Well, the work came along in good shape and the man made very satisfactory money at a rate of 50 cents for the job, and everything was satisfactory all around; but the man got sick and the next man simply couldn't make the same rate per hour, though a very fair mechanic. This set the superintendent to thinking and it didn't take him long to recognize wherein he had blundered. He at once went to "higher-up," said he had made a blunder; that he should have in that case, as was his general practice, based his rate on an average man. He wound up by recommending an increase of one-third in the rate. His "higher-up" was educated along the same lines as the superintendent was, and hence confirmed the increased rate.

Not the least interesting thing about this particular shop is that three days a week the apprentices receive two hours' education theory, and take a four-year course at that. The high boy at the end of the four-year course receives a college education at any technical college he selects. Of course, the shop has the first call upon him when he graduates. Of such are the elect in respect of the Kingdom of Mechanical Engineers; they will "know why they know what they know."

MAX H. C. BROMBACHER.

NEW YORK, December 19, 1910.

The Mesta Machine Company, Pittsburgh, works at West Homestead, Pa., shipped last week an 84 x 48 in. cross compound Corliss engine, with 60-in. stroke to the Republic Iron & Steel Company, at Youngstown, Ohio, and has also ready for shipment a 130-in. Helander barometric condenser to go to the Iroquois Iron Company, at South Chicago, Ill.

An Estimate of Iron Trade Conditions

The circular Market Report of C. S. Trench & Co., New York, for December 16 has the following bearing on conditions and prospects in the iron trade:

"The publicity that has been given to the reaction and falling off in orders and mill operations in the iron and steel trade and the refusal of the railroad interests to make their usual purchases has for the time being overshadowed the really sound condition of the country. The average business man has begun to feel that the unfavorable reports he is reading every day will become a fact later on in his own business, forgetting that the control and conditions under which the iron and steel trade is at present conducted do not make this interest as reliable a barometer as in former years, and that the policy of the railroads in withholding their orders is something that can be changed almost in a day. Our having increased our facilities of producing iron far in excess of our ability to consume does not make the fact of reduced operations necessarily mean that there is a severe recession in business, except as it may be compared with periods of great activity, which from the nature of things are abnormal and of short duration. A population of 92,000,000 of fairly prosperous people, who have just harvested the largest crop on record, are in a position to stand a good deal of the kind of unsettlement that we are now going through. We think 1911 will be an averagely good year; better than that we cannot expect, with the prospects of more or less unsettlement from the approaching tariff revision and other questions that we must expect to be constantly with us during the year. We think we are in a position to endure what is before us without serious difficulty; at the same time any ignoring of these questions, or attempts to imagine they are not real, would be foolish, and, if carried into action, unfortunate."

The Canadian Navy.—The Dominion Government will shortly call for tenders for four cruisers of the Bristol type and six destroyers of the improved river class, in accordance with the naval construction programme decided upon. Three years' time will be given for the delivery of the first ships. It is expected that two Canadian companies, with a British connection, respectively, with Vickers, Sons & Maxim and Harland & Wolff, will tender. There may also be tenders received from other British firms. The specifications require building in Canada, and this involves the establishment of shipbuilding plants on the Atlantic Coast. It is understood that whichever firm gets the contract will be prepared to arrange for construction in Canada. No United States tender will be considered. The total cost of these vessels is estimated at $10,000,000 to $12,000,000; but, in view of the requirement regarding construction in Canada, it may be found that tenders will aggregate considerably in excess of this.

The Cleveland Tool & Supply Company, Cleveland, Ohio, has purchased the stock, fixtures and good will of the Excelsior Supply Company, Detroit, distributer for Shelby seamless mechanical steel tubing in Detroit. The Cleveland Company will maintain the present warehouse and office at 29 East Atwater street, with an increased stock of tubing, as distributer for the National Tube Company, and will handle from Detroit the business formerly carried on by the Excelsior Supply Company in eastern Michigan. The transfer took place December 12. W. M. Roberts, formerly with the Excelsior Supply Company, will continue in charge of the Detroit warehouse and the former staff will be retained.

The Republic Iron & Steel Company has blown out its Hall furnace in the Shenango Valley.

A Steel Manufacturer's Views

The Recent Conferences of Producers and Market Prices

James A. Campbell, president of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has written on present iron market conditions in answer to an editorial in the Youngstown *Telegram*, which criticised the action of the manufacturers. Mr. Campbell says:

There have been no meetings of the manufacturers of steel products, with the exception of the very recent ones, since February 18, 1909, and there has been no effort of any kind to maintain a fixed price on any of the different lines of product, and as a consequence prices have been reduced from $4 to $14 per ton in a natural way by the effort of the manufacturers to secure business.

Pig metal is to-day being sold at from 50 cents to $1 per ton less than it costs the average merchant furnace to produce it, and many of the finished lines are being sold at or near cost. I cite for comparison prices of iron and steel products in 1907, before the financial disturbance, and present prices of the same products to show the reduction that has taken place. You can confirm these figures by referring to *The Iron Age* or the *Iron Trade Review:*

	July 1, 1907.	December 16, 1910.
Bessemer pig iron	$23.25	$15.00
Basic	22.00	13.25
Steel billets	30.00	23.00
Steel sheet bars	31.00	24.00
Rods	36.50	28.00
Steel bars	32.00	28.00
Structural steel	34.00	28.00
Wire nails	40.00	34.00
Steel sheets	52.00	44.00
Merchant steel pipe	53.36	39.00

To make further reductions the prices of ore, coke and limestone, our raw materials, as well as all labor, must be reduced. The iron and steel people, as far as I can learn, do not believe that the conditions at the present time warrant a reduction of labor.

A Lower Basis for Labor

It may be that before the country will again consume the full product of the blast furnaces and steel mills, prices must be lower, as the gentleman to whom you refer states, but if he will go into the subject further he must agree with those actively engaged in the business that before any material reduction can take place the cost of our raw materials and labor must be on a lower basis. If we are to have prices of 1893-1896, we must have like conditions. Many of us in the business think present prices fair, for if they go lower the smaller manufacturers must go out of business. The United States Steel Corporation has the power, due to its cheap raw materials and improved facilities of manufacture, to make it impossible for smaller companies to successfully compete, but it is not its policy to use its power in this way, for it well knows that such a course would mean great loss to itself and bankruptcy to many of the smaller manufacturers. You condemn the American Iron and Steel Institute for using its influence to maintain the present fair schedule of prices. Is not such an effort far preferable to trust methods of cutting prices, forcing the smaller and weaker manufacturers out of business and resulting in great ultimate benefit to the United States Steel Corporation and the stronger independents?

Not only the iron and steel manufacturers, the jobbers and consumers, but the business interests of the country in general owe to Judge Gary and the United States Steel Corporation a debt of gratitude they can never repay for the course pursued by them in the fall of 1907. Any other course would have meant bankruptcy and ruin to many, and the panic of that year was only a gentle zephyr as compared with the whirlwind it would have been had they made prices to secure business without any regard for their competitors.

The Work of the American Iron and Steel Institute

The "principal function" of the American Iron and Steel Institute is not to "maintain trust prices." It is to exchange information, and, as the name implies, be a course of education for all engaged in the iron and steel business. It is an organization similar to the American Institute of Mining Engineers or the Society for the Advancement of Science, and with all due allowance for the difference in the fields embraced, its functions are analogous to those of the above and kindred organizations. It is trying to better the conditions of labor, and already has succeeded in abolishing much Sunday work, and is trying to work out a plan whereby the man employed continuously can have one day each week for rest. In addition, it has had a great influence in preventing a reduction in wages at a time when the high cost of living demands that the workman shall receive every cent it is possible to pay him.

The institute is not doing anything in violation of the Sherman Anti-Trust law and has no agreements as to prices. As a matter of fact, its members are not quoting the same prices, nor have they done so at any time.

You mention the law of supply and demand and note that it is impossible to ignore or control it. You neglect, however, to advise your readers that labor is just as truly an economic commodity as is pig iron, and that its price is controlled by the same economic laws. A reduction in the present scale of prices of finished materials must positively be compensated for in the cost of their manufacture, and this compensation must largely be borne by labor. We note your reason for bringing up the question as you have is your interest in the workmen in the valley, a reason which is most commendable, but if you could hear the discussions in the meetings of the American Iron and Steel Institute you would realize that the steel manufacturers wish to do everything they can for the comfort and happiness of their employees. We certainly would like to give them steady employment, if for no other than the selfish reason that when they, or a portion of them, are idle our profits are correspondingly reduced.

In a later communication Mr. Campbell covers, as follows, two other points made in an editorial in the local journal:

You say: "First, that buying was greatly stimulated by the open market and its reduction in steel prices in 1909."

This statement is true, but only because every jobber, dealer and consumer had disposed of his stocks of materials on hand, and the radical reduction which took place on February 18, 1909, did stimulate buying to again replenish these stocks; also the season of the year when this occurred had considerable influence, as it was the opening of the spring season when the heaviest purchases are made. Because reductions were made then it does not follow that similar or lesser reductions can be made now. We are using ore now that is 50 cents per ton higher than then, which increases our cost of steel about $1.25 per ton. Also, on May 1, 1909, all labor was increased about 7½ per cent. It should be clear with the present low prices ruling and the increased cost, that further reductions at this time would close many of the smaller mills.

You say: "Second, that the market is to-day controlled, and that an artificial dam has been constructed to maintain prices."

This statement is not in accordance with the facts. I have already stated that since February 18, 1909, there have been no meetings and no influence has been exerted to maintain prices, and they have found their present low level in a natural way. At the meetings in the past two weeks no effort has been made to advance these prices.

Gary and Ensley Rail Mills Closed Down.—The heavy rail mill at the Gary, Ind., plant of the Indiana Steel Company was shut down December 14 and will be idle the remainder of the year. The company authorized the statement that the outlook is good for the resumption of operations at the usual time after the holidays. Orders have been issued for the closing down this week of the Ensley steel works and rail mill of the Tennessee Coal, Iron & Railroad Company, and they will be idle for about three weeks.

BIRMINGHAM, ALA., December 20 (*By telegraph*).—George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Company, officially announces that the Ensley steel plant will shut down December 23 and resume January 15. Blast furnaces Nos. 5 and 6 at Ensley will be blown out. The company will continue furnaces Nos. 2 and 3 at Ensley on basic iron, and furnace No. 4 at Bessemer on foundry iron.

The Jessop Steel Company, Washington, Pa., states that the fire in its rolling mill, December 14, was by no means so serious as reported in local newspapers. All damages have been made good, and the plant is now operating as before.

The new 12,000-ton steel freight boat, the Willis L. King, being built for the Jones & Laughlin Steel Company by the Great Lakes Engineering Works, was launched at the yards of the builder at Ecorse, near Detroit, December 17.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec.21, 1910.	Dec.14, 1910.	Nov.23, 1910.	Dec.22, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.50	$15.50	$15.50	$19.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	17.25
Foundry No. 2, local, Chicago	16.00	16.00	16.00	19.00
Basic, delivered, eastern Pa.	14.75	14.75	14.75	18.75
Basic, Valley furnace	*13.25*	13.50	13.50	17.70
Bessemer, Pittsburgh	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh	13.90	13.90	13.90	17.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	....	28.50	31.00
Open hearth billets, Philadelphia	25.50	25.50	25.50	30.60
Wire rods, Pittsburgh	28.00	28.00	28.00	33.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	15.50	15.50	16.00	20.00
Iron rails, Philadelphia	17.00	17.00	18.00	20.50
Car wheels, Chicago	13.50	13.50	13.50	18.50
Car wheels, Philadelphia	*13.00*	13.25	13.75	17.50
Heavy steel scrap, Pittsburgh	*13.50*	13.75	14.25	18.25
Heavy steel scrap, Chicago	12.00	12.00	12.25	16.00
Heavy steel scrap, Philadelphia	12.50	12.50	13.50	17.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.35	1.35	1.37	1.65
Common iron bars, Chicago	1.35	1.35	1.35	1.60
Common iron bars, Pittsburgh	1.40	1.40	1.40	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.71
Beams, Pittsburgh	1.40	1.40	1.40	1.55
Angles, tidewater, New York	1.56	1.56	1.56	1.71
Angles, Pittsburgh	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.25	1.55
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.30	1.60
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.70	1.70	1.70	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh*	2.00	2.00	2.00	2.15
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.00	13.00	13.00	13.75
Electrolytic copper, New York	12.75	12.75	12.87½	13.50
Spelter, New York	*5.75*	5.85	5.95	6.30
Spelter, St. Louis	*5.65*	5.75	5.80	6.15
Lead, New York	4.50	4.50	4.50	4.70
Lead, St. Louis	4.35	4.35	4.40	4.67½
Tin, New York	*37.90*	38.55	36.90	33.80
Antimony, Hallett, New York	7.75	7.75	7.75	8.25
Tin plate, 100-lb. box, New York	$3.84	$3.84	$3.84	$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized sheets, No. 28, $2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt Weld.				
⅛, ¼, ⅜ in.	72	58	68	54
½ in.	75	63	71	59
¾ to 1¼ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weights.				
⅛, ¼, ⅜ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1¼ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	64	58	60	54
¾ to 1¼ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in...	Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe. Butt or Lap Weld as specified.
2, 2¼ to 4 in.....	Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55
6 to 13 in.	61	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, $28; open hearth and chain rods, $28.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, December 21, 1910.—(*By Telegraph.*)

Pig Iron.—The only sale of moment during the week was one of about 2000 tons of standard Bessemer iron for December and January delivery at the reported price of $15, at Valley furnace. There is some inquiry for basic iron, several consumers having offered Valley furnaces a fair tonnage at about $13 at furnace, but they have been turned down. Some of the furnaces hold their basic iron for first quarter at $13.25 at furnace, while others are refusing to shade $13.50. It is possible that on small lots of basic for spot shipment some dealers would sell at $13 at furnace. The outlook for an improvement in prices in the near future is discouraging, stocks being heavy and steadily increasing. The consumption is very much below the output. We quote standard Bessemer iron, $15; basic, $13.25; No. 2 foundry, $13.75; malleable Bessemer, $13.75, and gray forge, $13, all at Valley furnace, with a freight rate of 90c. a ton for delivery in Pittsburgh district.

Steel.—While a good many contracts for sheet and tin bars expire by limitation December 31, nothing has been done as yet regarding renewals, consumers waiting to see whether present prices of steel will be maintained. We quote Bessemer and open hearth billets, 4 x 4 in. and up to but not including 10 x 10 in., at $23, base, and sheet and tin bars in 30-ft. lengths, $24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at $24 and forging billets at $28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(*By Mail.*)

The iron trade is simply marking time until the year is over, consumers taking in as little as possible. Since the meetings held here last week of the sheet, tin plate, steel bar and plate interests, the market on these products has been fairly well sustained and no radical reductions in prices are expected, for the present at least. The larger producers have found it a note of warning as to what may be expected if prices on the products named are not held better than they have been for some time, and it has had the desired effect. There is practically no new inquiry for pig iron, prices are merely nominal, and iron is piling up very fast in the furnace yards. A move is under way to combine some of the Valley furnaces that sell their pig iron in the open market, but so far it has made little headway. Regular prices on steel billets are $23 and on sheet and tin bars $24, Pittsburgh or Youngstown districts, but these prices are being shaded by some of the smaller mills on open hearth stock. Shipments of finished iron and steel this month by the mills will show a heavy falling off as compared with last month. Stocks held by distributors and consumers are very light, which is shown by the fact that with many of the small orders there are wire requests for prompt shipments. The trade is evidently afraid of a break in prices, and will continue to buy very cautiously until fully assured that they are going to hold. It may take some time to demonstrate this, and should a cut come, it will be a radical one.

Ferromanganese.—Carload lots for prompt shipment are held at about $38.50, Baltimore, but there is little or no new inquiry. We quote 80 per cent. foreign, for delivery through the first half, at $38.25 to $38.50, Baltimore, the rate to Pittsburgh being $1.95 a ton.

Ferrosilicon.—The market is bare of new inquiry. We quote 50 per cent. for delivery over first half at $54 to $55, and for prompt delivery at $55 to $55.50. We quote 10 per cent. blast furnace silicon at $23; 11 per cent., $24; 12 per cent., $25, f.o.b. cars Jisco and Ashland furnaces.

Skelp.—There has been no new buying in this market for several weeks. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Rods.—Some unevenness in prices in both Bessemer and open hearth rods has developed and reports are going that sales of Bessemer rods have been made at slightly under $28, Pittsburgh. Specifications against contracts are not satisfactory, and new demand is very dull. We quote Bessemer rods at $28 and open hearth about $28, f.o.b. Pittsburgh, but it is stated that on Bessemer rods the price has recently been shaded.

Muck Bar.—In the absence of any recent sales we continue to quote best grades of muck bar made from all pig iron at about $29, Pittsburgh.

Steel Rails.—There are no new developments regarding the large contracts for standard section rails which the leading roads are ready to place when the mills agree to meet the specifications demanded. It is stated that on 10,000 tons of open hearth rails which the Carnegie Steel Company is to roll to specifications for the New York Central the price will be $30 a ton and perhaps more. New demand and specifications for light rails have fallen off, only about 1500 tons having been booked by the local mill in the past week. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—The steel car interests are now figuring on the inquiry for 2000 steel coal cars which the courts granted permission last week to the Wabash-Pittsburgh Terminal to have built. Several roads are expected to have inquiries out soon after the first of the year. We continue to quote ¼-in. and heavier plates in the wider sizes at 1.40c., Pittsburgh, while on the narrow sizes 1.35c., Pittsburgh, is still being named. There are reports of lower prices than 1.40c. on wide plates being named by one or two mills.

Structural Material.—The McClintic-Marshall Construction Company has taken a contract for about 2200 tons for a public building in an Eastern city, and the American Bridge Company has taken about 1500 tons of bridge work for a Western railroad. The Carnegie Steel Company is now rolling the material on a contract for about 7000 tons of steel for the Minnesota Steel Company at Duluth. We continue to quote beams and channels up to 15 in. on the basis of 1.40c., Pittsburgh, but there are still persistent reports that this price is shaded by some mills as a basing price for delivery at certain points.

Sheets.—While prices are being better maintained as a result of the meeting held here last week, the sheet trade, from the standpoint of new demand, is in unsatisfactory condition, none of the mills running full. The American Sheet & Tin Plate Company is running to about 50 per cent. of its hot mill capacity, but some of the independent mills are doing a little better. The full schedule of prices on black and galvanized and on roofing sheets, affirmed at the meeting held here last week, is printed on a previous page.

Tin Plate.—It developed at the meeting of the tin plate manufacturers held here last week, that most of the large consumers are covered through the first half of next year. Specifications are coming in against these contracts at a fairly satisfactory rate, but there is very little new demand. It is stated that the market is now strong on the basis of $3.60 per base box for 100 lb. cokes, f.o.b. Pittsburgh.

Bars.—Specifications from the railroads against their contracts for iron bars are coming in a little better, but the new demand for both iron and steel bars is quiet. The makers held a meeting in this city last Thursday, and it was decided by those present to try to maintain the market on steel bars on the basis of 1.40c., Pittsburgh. This price was being quietly shaded in some cases, but it is claimed now that this has entirely disappeared. We, therefore, quote both iron and steel bars on the basis of 1.40c., Pittsburgh.

THE IRON AND METAL MARKETS

but for delivery at certain points, notably in the Chicago district, this is shaded as a basing price.

Hoops and Bands.—Specifications against contracts are coming in at only a fairly satisfactory rate, and new demand is very light and only for small lots. It is stated that prices are being fairly well maintained except at one or two competitive points of delivery. We quote hoops at 1.50c. in large lots and 1.55c. in small lots; bands, 1.40c. in carload and larger lots and 1.45c. in small lots, the latter carrying extras as given in the steel bar card dated September 1, 1909.

Cotton Ties.—On the small scattered orders being shipped out this month, 78c. per bundle is being charged.

Spikes.—There is no improvement in the demand, which is only for small lots to cover actual needs, while expected large orders from several of the railroads have so far failed to develop. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c., for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, in carload and larger lots.

Spelter.—The market is much lower. We quote prime grades of Western at 5.40c., East St. Louis, equal to 5.52½c., Pittsburgh. Efforts made by East St. Louis interests to hold prices last week failed completely, and still lower prices are predicted.

Merchant Steel.—Shipments by the mills this month will show a heavy falling off as compared with November, jobbers and consumers taking in as little as possible until after inventory. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.95c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—The demand is only for small lots, while specifications from the automobile builders and the implement makers, who are ordinarily the largest consumers of shafting, have been coming in very slowly for some time. Regular discounts are being fairly well maintained, and are 55 per cent. off in carload and larger lots, and 50 per cent. off in small lots, delivered in base territory. On desirable contracts and for large lots 55 and 5 per cent. is being named.

Wire Products.—Orders for wire nails and wire are light, while specifications against contracts have not been coming in well for some time. It is stated that regular prices are being quite well maintained. We quote galvanized barb wire at $2; painted, $1.70; annealed fence wire, $1.50; galvanized, $1.80; wire nails, $1.70, and cut nails, $1.60, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Merchant Pipe.—No large contracts for line pipe are being placed, as this is the dull season, but new orders in merchant pipe are about as heavy as expected in December. None of the pipe mills is operating to full capacity on account of lack of orders, but it is known that stocks held by dealers are low and a better buying movement is expected after the turn of the year. Discounts on both iron and steel pipe, printed on a previous page, are only being fairly well maintained.

Boiler Tubes.—Some large inquiries for locomotive tubes from two or three of the leading railroads are in the market and may possibly be placed before this year is out. The demand for merchant tubes is very dull and prices are more or less demoralized.

Iron and Steel Scrap.—The scrap trade is almost neglected, consumers not caring to take in material until after the first of the year. Prices are weak. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$13.50 to $13.75
No. 1 foundry cast	13.50 to 13.75
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, at point of shipment	9.00
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.00 to 13.25
Grate bars	11.25 to 11.50
Low phosphorus melting stock	17.50 to 17.75
Iron car axles	24.00 to 24.50
Steel car axles	20.25 to 20.50
Locomotive axles	24.50 to 25.00
No. 1 busheling scrap	12.25 to 12.50
No. 2 busheling scrap	8.75 to 9.00
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.75 to 16.00
Cast iron borings	7.90 to 8.00
Machine shop turnings	8.60 to 8.75
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Stove plate	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50

Coke.—There is no improvement in demand or prices for either furnace or foundry coke, and the whole coke trade is still in very unsatisfactory condition. The output of coke in the Upper and Lower Connellsville regions last week was 292,435 net tons, an increase over the previous week of about 3000 tons. We quote standard makes of furnace coke for prompt shipment at $1.45 to $1.50 per net ton, at oven, while for delivery over first half $1.75 to $1.80 is quoted. Best makes of 72-hour foundry coke for prompt shipment are held at about $2 per net ton, at oven, and for first half from $2.10 up to $2.50.

The corporation of Trimble, Mudge & Co., recently organized in this city with a capital of $250,000, and which took over the scrap interest of E. W. Mudge & Co., Pittsburgh, and Hazard, Mudge & Co., Buffalo, N. Y., has elected the following officers: H. N. Trimble, president; W. H. Barr, vice-president; W. S. Burchinal, secretary, and E. W. Mudge, treasurer. The new concern will become operative January 1. W. H. Barr, the vice-president, will have charge of the Buffalo interests of the company, with offices in Ellicott Square Building, Buffalo, and a scrap yard on the South Buffalo Railway at Lackawanna, N. Y. The general office will be in the Frick Building, Pittsburgh.

Crerar, Adams & Co. of Chicago, Ill., have been appointed distributers in the Chicago and St. Louis districts for the Shelby seamless cold drawn steel tubing made by the National Tube Company of Pittsburgh, succeeding the Excelsior Supply Company of Chicago, the former distributors.

Chicago

FISHER BUILDING, December 21, 1910.—(*By Telegraph.*)

A comparison with this time a year ago presents a striking contrast. The steel mills were then two to four months behind in deliveries, and buyers were ordering or specifying more than their requirements, which increased the pressure on the steel works, especially the merchant mills. This year the mills have only a small tonnage on their books, and new business is of hand to mouth proportions. Consumption is going on at a normal rate outside of industries affected by the railroad policy, and in some branches of the trade prospects are very favorable. There has never been so much structural steel work on the hands of architects and engineers as at the present time, although last week was the lightest of the year in this territory in contracts actually closed. In Chicago large building projects have been held back since last spring awaiting the new building code. The mills have figured recently on 70,000 tons of material for buildings and bridges in this city alone, and the business pending in the West is estimated at 300,000 tons. This includes only that railroad work for which definite plans have been prepared. Current specifications for structural material are light, as the fabricating shops have but little work left on their books. Stock market talk of lower prices is believed to be the principal cause of delay in placing work under contract outside of Chicago, as financial conditions are now favorable. There is not much new business in steel bars, and the railroads are only ordering bar iron for repair work. The wire mills are running about 70 per cent., a good showing for this season. The sheet business is slowing down, and operations after the turn of the year will depend on the volume of orders held back by jobbers pending their annual inventory. The Great Northern car order excites favorable comment, but large orders from other Western roads are not expected until the rate case at Washington is decided, as the roads will be able to get through the winter now and will not need any material increase in equipment until next fall. The scrap market continues weak and dealers have difficulty in disposing of material in transit. December has recorded the lowest prices of the year for scrap, and many steady buyers are carrying large stocks, which make new offerings unattractive.

Pig Iron.—Trading in pig iron in this territory is limited to small orders. On Southern iron, $11, Birmingham, is now generally recognized as the going price for the first half, and occasional lots for prompt shipment have been sold at concessions from this figure. The furnaces are taking very little business, as buyers have generally covered their requirements for the first quarter and many will wait until they can buy for second and third quarters. Northern iron is weaker under Valley competition, as Valley furnaces are shading $16 for Chicago delivery for first quarter and first half. Local furnaces are now meeting the $16 price for first quarter, for delivery in Chicago. This is equivalent to $15.50, at furnace, for shipment to outside points. Purchases with few exceptions are limited to small lots for short delivery periods. A remarkable feature of the Western market the past year is that the price has shown a weakening tendency after each buying movement. During the moderate movement last month in Southern iron a con-

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siderable tonnage was sold at $11.50 for first quarter and first half. Leading furnace interests are becoming more confident of a turn in conditions before the second quarter of the year. The following quotations are for December shipment, Chicago delivery:

Lake Superior charcoal	$18.00 to $18.50
Northern car foundry, No. 1	16.50 to 17.00
Northern coke foundry, No. 2	16.00 to 16.50
Northern coke foundry, No. 3	15.75 to 16.00
Northern Scotch, No. 1	17.00 to 17.50
Southern coke, No. 1	15.85 to 16.35
Southern coke, No 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	16.00 to 16.50
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	18.40 to 18.90
Jackson Co. and Kentucky silvery, 8%	19.40 to 19.90
Jackson Co. and Kentucky silvery, 10%	20.40 to 20.90

(*By Mail.*)

Billets.—The trade is quiet, with the price of forging billets nominal at $28, base, Chicago.

Rails and Track Supplies.—The open hearth rail mill at Gary was closed down last week. The Bessemer mill at the South Works continues in operation. The demand for track supplies is very light. It was confidently expected two months ago that a good tonnage of rails would be booked in Chicago before the end of the year, but railroads continue to hold back all purchases except for repair work, and they may follow this policy until the question of an advance in rates is decided. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Structural Material.—No important contracts are reported from any Western city for last week. In Chicago the new building code, although it has passed the Council, has not become law, as it requires a formal publication. This has been delayed by one unsettled question, the permissible hight of steel buildings. The old code fixed the limit at 260 ft. The mills have recently figured on 70,000 tons of plain material to go into river bridges and large buildings in Chicago. From Chicago territory to the Pacific Coast it is estimated that pending projects amount to nearly 300,000 tons. In the United States the work in prospect for the fabricating interests, including only railroad work for which actual plans have been prepared, is estimated at over 800,000 tons. For the present the letting of contracts has been checked by the talk of a possible reduction in steel prices. Financial conditions are now more favorable. Prices of plain material continue firm, but current business is light. The fabricators have little business on their books. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—The Great Northern Railway has ordered from the American Car & Foundry Company the 500 ore cars on its recent inquiry, and may buy the 75 tank cars this week. The specifications for 400 special hopper cars will be revised. This is the first good steel car order placed for some months by a Western road. The plate mills have but little business. We quote mill prices at 1.58c. to 1.63c., Chicago: store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The Inland Steel Company will close eight of its sheet mills this week, and may shut down the others next week. Current business is light, owing to the general tendency of jobbers to reduce stocks before taking inventory. Prices are firm, but there is not enough desirable business pending to give the market a severe test. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar iron business is picking up, especially from the railroads, whose specifications are steadily increasing. The mills are getting orders for quantities as large as 500 to 1000 tons with specifications for prompt shipment. This is the only line in which the railroads are reported buying freely. There is a fair amount of new inquiry for soft steel bars, some from the manufacturing trade and some from contractors for concrete work. The best inquiries at present for concrete bars are from the Southwest. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.35c. to 1.40c.; hard steel bars rolled from old rails, 1.40c. to 1.45c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—The wire mills are running better than any other important branch of the steel industry, as they are running about 70 per cent. Jobbers are giving good specifications for January and February shipment, especially in the South and Southwest, where trade conditions are very favorable. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Merchant Steel.—The agricultural demand has not been affected by the recession in the steel industry, and specifications for special grades of agricultural steel continue very satisfactory. Some of the automobile manufacturers are making 75 per cent. of last year's output, but the majority have curtailed operations 50 per cent.

Cast Iron Pipe.—Business is quiet in this territory and not much is expected until January, when good specifications will be advertised by Northern cities. The gas companies are inquiring for their requirements for next year. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $27; 6 to 12 in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

Old Material.—The recent slump in scrap has apparently spent its force and the market is steadier, though weak. Western railroads have not established any minimum selling price on rerolling rails, but the recent decline was at the expense of the dealers, who had bought from the railroads at higher prices, expecting a more active demand this winter. Steel mills are slow in taking open hearth scrap, and the rolling mills are carrying heavy stocks of wrought material. Even foundry scrap has weakened, and No. 1 cast seldom brings a better price than $12.25, delivered. The system which has grown up of selling scrap to consumers while it is in transit, and reconsigning cars to the purchasers, saves expense of unloading and reloading material, but makes the market very sensitive. The check in consumption caused by the inventory season has made it hard for dealers to place shipments which are arriving. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to $1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old iron rails	$15.50 to $16.00
Old steel rails, rerolling	14.00 to 14.50
Old steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Shoveling steel	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars	$13.50 to $14.00
Iron car axles	18.50 to 19.00
Steel car axles	18.25 to 18.75
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Springs, knuckles and couplers	11.50 to 12.00
Locomotive tires, smooth	17.00 to 17.50
No. 1 dealers' forge	10.00 to 10.50
Steel axle turnings	7.75 to 8.25
Machine shop turnings	6.50 to 7.00
Cast and mixed borings	5.00 to 5.50
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	12.25 to 12.75
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.50 to 11.00
Pipes and flues	8.75 to 9.25

Philadelphia

PHILADELPHIA, PA., December 20, 1910.

Characteristic year-end conditions prevail. With the exception of several fair sales of pipe iron, little has been done in pig iron. In some instances deliveries are being curtailed, pending inventory work. The volume of business coming to the finishing mills shows little change. Orders for 4000 tons of rails for prompt delivery have been placed with one of the Eastern mills by the Norfolk & Western Railroad, while an inquiry is out for 15,000 tons of the Chesapeake & Ohio. The Pennsylvania Railroad and the mills are reported as getting closer together on rail specifications, but nothing definite has been done. There has been little movement in old material.

Iron Ore.—The market is at a standstill. Importations at this port during the week ending December 17 aggregated 22,703 tons, valued at $67,130.

Pig Iron.—The principal movement has been in low grade irons, one sale of 6000 tons being reported for delivery during the next few months. Pipe makers are still in the market, with inquiries for about 10,000 tons. In the higher grades of foundry iron several transactions covering quantities up to 300 tons of both No. 2 X and No. 2 plain grades are reported, but the majority of the sales have been in smaller amounts. Standard eastern Pennsylvania brands of No. 2 X foundry are comparatively firm at $15.50 to

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$15.75, delivered in this vicinity, shipment extending over various periods up to the end of the first quarter. There is less disposition on the part of some producers to make the usual 50c. differential between No. 2 X and No. 2 plain grades, and in instances but a 25c. differential is quoted. Sales of Virginia foundry grades have been confined to small lots, the principal sellers firmly maintaining the $13 furnace basis for either No. 2 X or No. 2 plain grades, equivalent to a minimum of $15.80, delivered in this vicinity. Very little movement in forge iron is reported; one inquiry for 600 tons is before the trade, but no sales are reported. Makers hold pretty firmly at $14, Eastern furnace, for this grade, equal to $14.25, delivered, according to destination. In basic iron, one consumer is still feeling around for a moderate lot for early delivery, which would be taken if the price was low enough. Sales of several hundred tons of low phosphorus iron have been made at $22.50, delivered in this vicinity. Inquiries for pig iron generally are falling off, as is customary at this season. While there has been no further curtailment in production announced, it is believed that a further blowing out of furnaces will take place during the early months of next year. Quotations are unchanged, the following range representing the market for standard eastern Pennsylvania brands, delivered in buyers' yards in this vicinity during the first quarter:

Eastern Pennsylvania, No. 2 X foundry	$15.50 to $15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.25
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.25 to 14.50
Basic	14.75 to 15.00
Standard low phosphorus	22.50

Ferromanganese.—Practically no demand from consumers in this territory is reported. While the leading sellers name $38.50, Baltimore, as a nominal quotation for first half delivery, offerings for prompt shipment are reported at $38.25, seaboard.

Billets.—Business has been very light, principally small lots for early delivery. Eastern mills name $25.50 for ordinary open hearth rolling billets, but would meet Western prices, which would be $25.40, delivered in this vicinity. Forging billets, while not particularly active, are firm at $28, Eastern maker's mill, the usual extras being added for high carbons and special sizes.

Plates.—Individual orders are not large as a rule, and cover the full range of consumers' requirements. There is practically no forward buying being done. Mills are firmly maintaining the minimum quotation of 1.55c. for ordinary plates, delivered in this vicinity, the same price being quoted in instances for either large or small lots. A moderate tonnage of plates for the new Heckscher Furnace is expected out in the near future.

Structural Material.—A fair run of miscellaneous business comes out, but little has developed in propositions requiring any large quantity of shapes. Several moderate building projects are still under negotiation. Mills are operating at an unchanged basis, but the amount of old orders on their books is gradually becoming smaller. Prices are firm, at 1.55c. for plain shapes, delivered in this vicinity.

Sheets.—Mills are catching up with orders on hand and preparations are being made for the usual year-end shutdown. In some instances part of the capacity has already been closed down and, unless there is a rush in the demand, will not start up again until after the first of the year. Eastern mills are holding prices firmly, the following range being quoted for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—While the bulk of the business is small, several round lots of refined iron bars for delivery over the first quarter have been placed at prices ranging from 1.25c. to 1.30c., Eastern mill. For the general run of prompt business, 1.35c. to 1.45c., delivered, is quoted. Specifications on steel bars, particularly from agricultural makers, have been heavier. Quotations for steel bars are named at 1.55c., although independent mills are understood to have slightly shaded that quotation.

Coke.—With the exception of an occasional transaction in furnace coke, very little business comes out. Negotiations are still pending for next year's supplies of furnace coke, for which quotations range from $1.65 to $1.75, at oven. The foundry coke market is quiet, with transactions closely confined to small lots for early delivery at unchanged prices. Quotations range about as follows per net ton, delivered in buyers' yards in this vicinity:

Connellsville furnace coke	$3.90 to $4.00
Foundry coke	4.20 to 4.40
Mountain furnace coke	3.50 to 3.60
Foundry coke	3.85 to 4.05

Old Material.—Mills are taking on occasional bargain lots, but are not buying for extended delivery. Odd lots of heavy melting steel have been sold at $12.50, delivered, but some consumers are willing to pay $13 for strictly high grade material. Rolling mill grades have been particularly dull and there is a tendency toward lower prices. While quotations are to a large extent nominal, the following range about represents sellers' ideas of the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 45c. to $1.35 per gross ton:

No. 1 steel scrap and crops	$12.50 to $13.00
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	18.00 to 18.50
Old steel axles	19.50 to 20.00*
Old iron axles	26.00 to 27.00*
Old iron rails	17.00 to 17.50*
Old car wheels	13.00 to 13.50
No. 1 railroad wrought	15.75 to 16.25
Wrought iron pipe	12.25 to 12.75
No. 1 forge fire	11.00 to 11.50
No. 2 light iron	7.00 to 7.50
Wrought turnings	8.00 to 8.50
Cast borings	8.00 to 8.50
Machinery cast	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Grate bars	11.00 to 11.50
Stove plate	10.00 to 10.50

* Nominal.

The Alan Wood Iron & Steel Company has decided to go ahead with the erection of an alternate blast furnace stack at its Heckscher plant. Much of the work of grading and building of foundations will be done at convenient times by the company itself. The stack will have a capacity of 350 to 400 tons a day, and will only be put in commission when one of the other furnaces is out of blast, using the blowing engines of the idle stack. Julian Kennedy, engineer, Pittsburgh, Pa., will have charge of the erection of the furnace and will shortly place contracts for at least a part of the shell plates required.

Sloan, Howell & Co., iron, steel and supply merchants, formerly located at 1625 Real Estate Trust Building, Philadelphia, have changed the title of the firm to Sloan & Co., without any change in the officials of the concern. The offices have been removed to suite 1520, in the same building.

Cincinnati

CINCINNATI, OHIO, December 21, 1910.—(*By Telegraph.*)

Pig Iron.—The week opened up with a scarcity of both inquiries and orders. Contract iron is moving about as usual, but new business is confined to a small tonnage from the jobbing foundries and stove makers to fill out immediate requirements. Local agencies generally believe that soon after the first of the year a turning point for the better will be reached, and that as soon as a buying movement is started prices are expected to recover much faster than they eased off. Southern No. 2 foundry is quotable for either prompt or first quarter shipment at $11, Birmingham, and a firm offer at this figure would probably be accepted by some producers for first half delivery, although several are maintaining $11.50 for the second quarter. Northern No. 2 foundry is unchanged at $14, Ironton, for any delivery until July. Malleable is not in demand, but is quotable around $14.25 to $14.50. For the remainder of the year, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$14.75 to $15.25
Southern coke, No. 2 foundry	14.25 to 15.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern coke, No. 4 foundry	13.50 to 14.00
Southern coke, No. 1 soft	14.75 to 15.25
Southern coke, No. 2 soft	14.25 to 14.75
Southern gray forge	13.50 to 14.00
Ohio silvery, 8 per cent. silicon	19.20
Lake Superior coke, No. 1	15.70 to 16.20
Lake Superior coke, No. 2	15.20 to 15.70
Lake Superior coke, No. 3	14.70 to 15.20
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	22.25 to 22.75

(*By Mail.*)

Coke.—Curtailment of furnace coke production is about keeping pace with that of pig iron, but in the Connellsville field there is still some cheap spot shipment coke. Last week about 8000 tons of furnace coke was sold, for immediate shipment, on a basis of $1.45 per net ton at oven, but $1.50 to $1.60 represents the average prices in all three districts for spot shipment, with $1.65 to $1.85 named for contracts. Foundry coke is only being sold in small quantities and the movement on contracts previously made is reported to be slackening up somewhat. Spot foundry is quoted around $2 and contract foundry at about $2.25 per net ton at oven in the Wise County Pocahontas and Connellsville fields.

Finished Iron and Steel.—Several inquiries are out for splice bars and car material from the railroads, but little actual business is being transacted. The price of 1.35c. is still being made by some of the independent mills for certain widths of plates, but 1.40c., Pittsburgh, is strictly adhered to by the larger interests. Structural material is moving

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slowly, but a good spring business is anticipated. Warehouse prices on structural material remain from 1.75c. to 1.85c.

Old Material.—The market continues very quiet, with prices a little lower than those prevailing for some weeks. Railroad offerings are light. Prices for delivery in buyers' yards, Cincinnati and southern Ohio, are as follows:

No. 1 railroad wrought, net ton	$12.00 to $12.50
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 12.00
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	22.50 to 23.50
Old car wheels, gross ton	12.00 to 13.00
Heavy melting steel scrap, gross ton	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, December 20, 1910.

Iron Ore.—A few reservations of Old Range Bessemer ore for the coming season have been made in the past few days, the purchasers agreeing to pay the market price as determined later. It is not expected that the ore firms will take up the question of prices until well along in the spring, as the general buying movement next year will be very late. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The market has settled down to a spell of almost complete inactivity. There are practically no sales or inquiries, and selling agencies generally have deferred efforts to book tonnage until after the first of the year. Shipments have fallen off considerably during the week, as the result of requests from foundries that shipments be held up until January. A few inquiries that came out during the first half of the month have not yet resulted in the placing of orders. Prices remain stationary, but there has not been an inquiry of sufficient size for some time to thoroughly test the market. For first half delivery one local furnace is holding to $14.25 for No. 2 foundry, delivered, and another furnace is not shading $14.50. Another Central Western furnace, No. 2 stack of the Detroit Iron & Steel Company, has gone out of blast. Repairs have been completed to the furnace of the Upson Nut Company, Cleveland, but the blowing in of this stack has been indefinitely deferred. For prompt shipment we quote, delivered, Cleveland, as follows:

Bessemer	$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	14.25
Northern foundry, No. 3	14.00
Gray forge	13.90
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	19.00

Coke.—The Canada Iron Corporation, Midland, Ontario, has closed a contract for its furnace requirements during the entire year, amounting to 7000 tons per month, on a sliding scale basis. The foundry coke market is generally quiet. A few inquiries for first half are pending, and there is some demand for small lots of spot coke. Prices are stationary. We quote standard Connellsville furnace coke at $1.45 to $1.55 per net ton, at oven, for spot shipment, and $1.75 to $1.80 for the first half. Connellsville 72-hour foundry coke is held at $2 to $2.10 for spot shipment and $2.15 to $2.50 for the first half.

Finished Iron and Steel.—Mill agencies and jobbers report a light demand for all finished lines. Current orders and specifications are both small in number and for small lots, few being for as much as carloads. Consumers generally are allowing their stocks to run quite low. Prices on steel bars and structural material are firm, at 1.40c., Pittsburgh. The demand for plates continues dull, and the usual shading is being done by mills making only the narrow sizes. Very little sheet business has come out since the meeting held in Pittsburgh two weeks ago to attempt to hold up prices to the regular quotations, and prices appear to have so far been maintained, although no inquiry has come out of sufficient size to test the firmness of the market. The demand for structural material is light. Local fabricating plants have only a limited amount of work on hand. While the outlook is very promising, none of the prospective local work is expected to come out until after the first of the year. Among new work for next season that developed during the week is a 14-story office building to be erected by the Leader Printing Company in this city. Bids have been rejected for the Pingree Building in Detroit, requiring 800 tons of steel, and the plans will be changed somewhat. The demand for iron bars continues light, but both of the local mills are running this week. Prices on iron bars are weak, at 1.30c. to 1.35c., Cleveland.

Old Material.—The market is lifeless. Not only are the local mills buying nothing, but they are refusing to take shipments of scrap on contract. All of the local mills have fair sized stocks on hand, and they are expected to hold back on shipments until after the first of the year. The continued absence of a demand has had a decidedly weakening tendency on the market, and quotations are nominal, there being no sales on which to base new prices. In view of this condition we have not changed last week's quotations, but it is certain that should any actual business develop it would be done at prices below present quotations on practically all grades. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.00 to $14.50
Old iron rails	16.00 to 16.50
Steel car axles	19.50 to 20.00
Heavy melting steel	12.75 to 13.00
Old car wheels	12.50 to 13.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	11.75 to 12.00
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	6.00 to 6.50
Iron and steel turnings and drillings	6.75 to 7.00
Steel axle turnings	8.75 to 9.00
No. 1 busheling	11.00 to 11.50
No. 1 railroad wrought	12.75 to 13.25
No. 1 cast	11.50 to 12.00
Stove plate	10.50 to 11.00
Bundled tin scrap	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., December 19, 1910.

Pig Iron.—A considerably smaller tonnage is reported sold the past week than the week previous, with less specific information relative to the disposition of producers in the matter of price for round tonnages and forward deliveries. It is understood that so far none of the offers of a lower basis than $11, Birmingham, for No. 2 foundry, has been accepted even for lots of 1500 tons and upward, yet it has been rumored that spot shipment was had at $10.75, with $10.50 mentioned as the probable consideration in a lot of 500 tons. The sales that were reported are in the main lots of 150 tons to 350 tons each, for shipment during the next 60 to 90 days. A lot of 350 tons for strictly second quarter shipment is reported sold at $11.25. The most significant development within the week was the announcement that four furnaces now in blast on foundry grades would be blown out prior to January 15, with an intimation that a fifth stack would go out about February 1. In view of the curtailment to be effected and the heavy movement from furnace yards immediately after January 1, reasonably expected by reason of the resumption of foundry operations at that time, producers generally anticipate a stronger market for prompt or comparatively early shipments. As a matter of fact, three of the local interests are now practically out of the market by reason of their refusal to meet current prices. It is also a fact that no merchant iron is being offered at present and that the majority of warrant holdings represent a considerable higher price than could now be obtained. Such conditions will, of course, not be without effect on the market price, but the extent to which the demand will take definite form after January 1 is no doubt the most important consideration. The bona fide inquiries now pending are attractive in the aggregate, but with the buyers disposed to await further developments.

Old Material.—The aggregate movement is very small comparatively, and, as in the case in the pig iron market, prices are very much at variance. For certain grades dealers are disposed to advance their asking prices, but the buyers of all grades continue to provide for their requirements on the hand-to-mouth order. We revise dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron axles	$14.00 to $14.50
Old iron rails	12.00 to 12.50
Old steel axles	14.00 to 14.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.00 to 9.50
No. 1 country	7.50 to 8.00
No. 2 country	7.00 to 7.50
No. 1 machinery	9.50 to 10.00
No. 1 steel	10.00 to 10.50
Tram car wheels	9.00 to 9.50
Standard car wheels	10.00 to 10.50
Light cast and stove plate	7.50 to 8.00

Cast Iron Pipe.—Report has recently been made of several significant bond issues for improvements to water systems and the aggregate tonnage known to be under consideration is large. The business represented by definite inquiries recently received is of small volume. There has been no change in quotations, producers not being disposed to make further concessions in order to move their stock accumulations. It is understood that all local plants will be closed down for a period of 10 days or more after this week for the annual inventories. The aggregate of unfilled orders

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at the close of the year will probably be less than was anticipated some moths ago. We quote water pipe as follows, per net ton, f.o.b. here: 4 to 6 in., $19 to $19.50; 8 to 12 in., $18 to $18.50; over 12 in., average, $17, with $1 per ton extra for gas pipe.

The Republic Iron & Steel Company is preparing to blow out one furnace at its Thomas plant for relining. The furnace of the Southern Iron & Steel Company, at Trussville, has been blown out. The plant of the Gadsden Pipe & Fittings Company, at Gadsden, Ala., recently destroyed by fire, will not be rebuilt.

Buffalo

BUFFALO, N. Y., December 20, 1910.

Pig Iron.—Exceedingly quiet conditions prevail. Many consumers are either proceeding with inventories or clearing their yards in preparation, and are not taking iron from the furnaces on contract as freely as they otherwise would. The aggregate of inquiry is less than for any week in the past two years, and orders have also been at a minimum rate. It is probable that on offers for good sized tonnages or specially desirable business some furnaces would shade the prices scheduled below, but in a general way they approximate the market as closely as possible for prompt and first quarter deliveries, f.o.b. Buffalo:

No. 1 X foundry	$15.00 to $15.50
No. 2 X foundry	14.50 to 15.00
No. 2 plain	14.50 to 14.75
No. 3 foundry	14.25 to 14.50
Gray forge	14.00 to 14.25
Malleable	14.75 to 15.25
Basic	14.50 to 15.00
Charcoal	17.50 to 18.25

Finished Iron and Steel.—New business has consisted principally of small orders for rush material, so that, while the demand on the jobbers has been quite good, the demand on the mills and shipment from the mills have been comparatively light. An encouraging feature of the situation is that some purchasers are asking that their contracts which expire the first of the year be extended to cover the first quarter of 1911 at the same prices. In bar and plate material prices are firm at 1.40c., Pittsburgh, with the exception of iron bars, which are being quoted a little under this rate. A small order for Wemlinger type of sheet piling has been placed for bridge abutment work on the West Shore Railroad in western New York and an inquiry is in the market for sheet piling of the same type for sewer construction work at Niagara Falls. The Canadian export trade continues in good volume in all lines. A large amount of railroad material has been ordered by Canadian car builders recently. The agency of the leading interest reports an aggregate of 20,000 tons having recently been placed covering railroad requirements for different parts of the Dominion and 2500 tons of plates have lately been taken for shipbuilding requirements. In structural material lines it is evident that a number of large building projects will take definite form early in the year, steps having been taken during the last two or three weeks to put into definite shape several such projects which had been held in abeyance for some time. The Lackawanna Bridge Company has taken Erie Canal contracts for 1600 tons of bridge work at Lockport and 1200 tons for near Syracuse. Bids are now being received for additional bridge work in connection with canal contracts.

Old Material.—Little business is being transacted and most consumers are holding back shipments on contracts. The demand for borings and turnings, which was somewhat active for a week or more, has eased off, buyers' requirements being pretty well taken care of for some time ahead. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$11.75 to $12.25
Low phosphorus steel	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	18.50 to 19.00
Old iron axles	23.00 to 23.50
Old car wheels	14.00 to 14.50
Railroad malleable	13.00 to 13.25
Boiler plate	9.75 to 10.25
Locomotive grate bars	10.50 to 11.00
Pipe	9.75 to 10.00
Wrought iron and soft steel turnings	7.00 to 7.50
Clean cast borings	6.50 to 6.75

St. Louis

ST. LOUIS, MO., December 19, 1910.

Pig Iron.—Some of the leading brokers did quite a good business in pig iron the past week, when the general situation and the near approach of the holiday season are considered. One sold in the aggregate 2000 tons of Southern foundry iron, for shipment this month and over the first quarter, and was also in receipt of inquiries totaling 1500 to 1800 tons, principally for Southern No. 2 foundry. Another agency sold upward of 1000 tons of Southern in small lots for forward shipment. A third stated that it had secured some good sized contracts. An inquiry is reported for 600 tons of analysis iron from an Illinois stove company for shipment over the first half, and another inquiry for 300 tons of Southern No. 2 foundry, same shipment. A sale of 300 tons of 8 per cent. silicon was made to a local stove company. While in some instances a higher price is asked, we quote Southern No. 2 foundry for shipment over the first quarter at $11; second quarter, $11.25, f.o.b. Birmingham.

Coke.—The only sale of importance was 1000 tons of foundry coke. The market is weak, but we continue the quotations of last week: $2 to $2.25 for best 72-hour Connellsville foundry per net ton, f.o.b. oven.

Old Material.—The market is weaker, owing to absence of new business or the prospect of any of consequence until after the turn of the year. Relaying rails continue in demand, but are easier. The only railroad list on the market the past week was that of the Mobile & Ohio, 1175 tons. The quotations reflect conditions, and are in some instances off 25c. to 50c. per ton. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	12.75 to 13.25
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates	$11.00 to $11.50
Iron car axles	18.00 to 18.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Railway springs	10.00 to 10.50
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	4.50 to 5.00
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	9.00 to 9.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.50 to 9.00
Pipes and flues	9.00 to 9.50
Railroad tank and sheet scrap	9.00 to 9.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.50 to 8.00

The German Iron Market

Bar Prices Weakening

BERLIN, December 8, 1910.

The market remains very quiet, with perhaps a slight weakening of the general tendency. Opinions regarding the situation, however, are not wholly agreed, some observers being disposed to regard the course of the trade as quite satisfactory, while most of the market reviews admit a waiting tendency in most lines of goods. Some say that orders are coming in very slowly, and that in certain classes of goods the amount of work on hand will not keep the mills busy longer than a few weeks. The section of the market that attracts most attention continues to be the bar trade. It is generally admitted now that price cutting has become very general in this specialty, so that the price convention can hardly be said to exist. According to agreement it is to last until the end of March, and it already seems very doubtful that it will be renewed. Some of the members think it would be better for the convention to terminate at once, rather than have the existing uncertainty continue. The present demoralization of prices is giving foreign markets a good opportunity to buy German bars at low rates. It is asserted in the reviews that German mills are selling for export at as low as 95 marks per ton, on board ship at North Sea port. The home price is nominally 112 to 114 marks, according to quantity ordered. Within the past few days offers of bars at 105 in the central districts of the country have been made.

The pig iron market remains in a satisfactory position. There is no let-up in production, and iron appears to be going into consumption as fast as produced. The foreign demand is active. Exports in November reached 66,600 tons, against 48,800 tons for November, 1909. Home consumers are calling for iron on contract at a rate satisfactory to furnacemen. It is said to be difficult to get suplementary orders filled on short notice. The consumption of old material continues heavy, but the supply coming upon the market is ample. In the Silesian district dealers in old iron raised their prices in November about 3 marks per ton. The situation in the ore market has hardly changed;

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prices are firmly maintained, both for home and foreign qualities.

Conditions in Finished Lines—Larger Allotments Asked

In half rolled steel material consumers are calling for goods on order at their regular pace. Nearly all have provided for their requirements to the end of the March quarter. The English market continues to make an active demand, which has not been influenced by the political excitement there. Belgian competition is felt there less sharply now, and American competition is hardly felt at all. In beams and other structural forms business is rather quieter in view of the advanced season of the year. In steel rails home business remains very far below normal, but the union has greater foreign orders than ever before. There are excellent prospects for good orders for lighter and grooved rails. Heavy rails for export cost 105 to 110 marks, on board ship; light rails for secondary railroads in the home market, 135 to 140 marks, and grooved rails, 140 to 145 marks.

Business in plates has grown slacker. In lighter plates some of the mills are so short of work that they can fill orders within a week or two. The demand for ship plates has gradually reached a normal level. The combination controlling this product, however, is meeting with some trouble in securing its prolongation, as several smaller works are demanding bigger allotments. A meeting will be held December 21 to try to arrange for its renewal. The Steel Works Union is also to hold a meeting December 20 to consider a proposal to increase the allotments in plates and piping. The Thyssen Company is demanding an increase of 20 per cent. in its allotments in piping, and the Rheinische Stahlwerke is asking for an increase of 10 per cent. in plates and bars. It is hardly believed that the union will grant these increases. The allotments in bars already amount to 3,475,000 tons. The market, as shown above, is demoralized, and it can hardly be expected that the organization will permit an increase of 347,500 tons to further glut it. The shipments of bars for the first 10 months of the year amounted to 2,842,000 tons, against 2,363,000 for the like months of 1909. In tubes they amounted to 100,200 tons, against 76,400 tons, and in plates to 808,400 tons, against 728,400.

The hardware trade has continued to improve at a moderate pace. The outlook for builders' hardware is regarded as promising; considerable orders for spring delivery are already coming in. At Solingen business in cutlery and other steel goods is very active, the Christmas trade having been quite heavy. Manufacturers of swords, sabers and bayonets are working on big foreign orders. There is a heavy demand for parts of automobiles and bicycles. The manufacturers of screws have just advanced their prices by reducing the rebate 3 to 4 per cent., an advance that was felt to be much needed. Business in wire and wire nails has grown rather quieter. Export business is meeting with sharp competition from foreign producers.

Foreign Trade

The latest reports from the Belgian market show that the firmer tendency recently reported continues, and it is counted upon to last, at least, through the first quarter of 1911. The American situation is attracting close attention. The decision of the United States Steel Corporation to restrict production rather than reduce prices has been commented upon favorably in the German trade. The event makes the impression that conditions on your side will, at least, become no worse than they are, and it is even believed that the decision of the corporation will soon cause orders to come out which had been held back with the hope of getting more favorable terms.

The following are Germany's exports of the leading kinds of iron and steel in November, as compared with those of a year ago, in metric tons:

	1910.	1909.
Pig iron	66,625	48,819
Half-rolled material	42,275	44,000
Beams	21,726	23,380
Steel rails	47,086	40,330
Iron ties	6,786	15,335

The Krupp Company has just declared a dividend of 10 per cent., against 8 per cent. last year, on its capital of 180,000,000 marks.

New York

NEW YORK, December 21, 1910.

Pig Iron.—Business closed in the past week includes 1500 tons for a Newark, N. J., foundry and 1500 tons for a malleable foundry in New York State. The inquiry from a nearby New York State point for 2500 tons is still pending. A number of 100-ton lots have been asked for, and there are other indications that foundrymen are not interested in supplying their wants very far into 1911. Furnaces seem to be making more effort to sell, and the market is therefore distinctly in the buyer's favor. We continue our quotations for tidewater deliveries as follows: Northern No. 1 foundry, $15.50 to $15.75; No. 2 X, $15 to $15.25; No. 2 plain, $14.50 to $14.75; Southern No. 1 foundry, $15.50 to $15.75; No. 2, $15.25 to $15.50.

Finished Iron and Steel.—Inquiry, particularly for structural material, is better than for some time. A number of the railroads are in the market for their requirements in bar iron and track supplies for the year 1911. The Delaware, Lackawanna & Western is inquiring for 5000 tons. The Chesapeake & Ohio has already closed for 3500 tons. Plates in this territory are in very poor demand. A disappointment has been the holding up of awards on the material for the battleship which was to be built at the New York Navy Yard since the estimated cost will exceed the appropriation. The Worth Brothers Company was low bidder for the plates. Rumor has it that the Quebec Bridge award has gone to an English company. Bids on the revised specifications for the post office at the Pennsylvania Terminal went in December 20; as it now stands, about 6000 tons will be needed. Only the three low bidders on the original contract were asked to rebid, Richard E. Heningham, George A. Fuller Company and John Gill & Sons. Bids were received December 19 on the 3000 tons for the Sloane Building, but the award is not yet announced. Award on the bids for the Harlem prison, 3000 tons, has been held up by an injunction, the enjoiner holding that the specifications were prejudiced; P. J. Carlin was low bidder. Bids have been submitted on 2000 tons for the Masonic Temple addition, New York, and have been asked for another at Washington, D. C., 1000 to 2000 tons. December 22 bids go in on 2000 tons for an appraiser's store in Boston, and January 14 on the new building for the Bureau of Printing and Engraving at Washington, 7500 tons. No results are reported on the bids asked by the Thompson-Starrett Company for the Greeley Square Hotel. It is confirmed that the Public Service Electric Co. is in the market for 1000 tons for a power house at Perth Amboy, N. J. A lumber wharf is reported as being planned at New Orleans which will require about 1500 tons of structural steel. Cramp & Co. have the general contract for the extension to the Packard Motor Company building in Philadelphia, for which 1000 tons will be needed. H. J. Spieker & Co. were awarded 500 tons of reinforcing bars and the Toledo Iron Works 500 tons of structural material for the two high schools to be erected in Cleveland, Ohio. The Eastern Steel Company will furnish 100 tons for an extension to a cement plant in New York State. An inquiry is in the market for a Scherzer rolling lift bridge in New Jersey, which will take 300 to 400 tons. Prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.45c. to 1.50c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Steel Rails.—A sale of 2000 tons has been made by the Pennsylvania Steel Company to a trolley road in Connecticut. The Illinois Steel Company sold 3800 tons last week, including 1000 tons for the Toledo, Peoria & Western and 2000 tons to a frog and switch company. The Tennessee Company will roll 5100 tons of 70-lb. rails for the Mexico Northwestern Railway. The Carnegie Steel Company has taken a contract for 6700 tons of 85-lb. rails for the Pittsburgh & Shawmut Railroad Company and has sold 1000 tons for frogs and crossings.

Ferroalloys.—Ferrosilicon is in good demand and it is being offered in this market at around $55.50, Pittsburgh. Ferromanganese is fairly active, but prices continue weak; sales have been made in this market at $38.50 seaboard, for delivery over the first half, and there are reports of transactions at lower prices.

Cast Iron Pipe.—The city of Baltimore opens bids today on 2760 tons, including specials, the pipe ranging from 3 to 36 in. The Board of Trustees of Angola, N. Y., will open bids January 11 on about 850 tons of water pipe, 50 hydrants, with valves, boxes, &c., and a steel standpipe, in accordance with plans and specifications of Witmer & Brown, water works engineers, Chapin Block, Buffalo. General conditions are quiet, as usual at this season. Carload lots of 6-in. are quoted at $22 per net ton, tidewater.

Old Material.—The most interesting feature of this branch of trade is the development of an export demand. Several thousand tons of steel melting scrap are wanted for shipment to Europe, the price offered being somewhat above that prevailing for domestic business, which indicates the better condition of trade across the Atlantic. It is expected that the beginning of an export trade thus made will lead to fairly large proportions, unless an improvement should occur in the domestic market, causing a rise in home prices. Domestic business is exceedingly quiet. Not only are orders light, but dealers generally are being requested

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to withhold shipments on contracts until after January 1. Such sales as are now being made are only when very attractive prices are quoted to buyers. A sale of a quantity of wrought scrap was made to a mill in the central part of the State at $11.50, delivered. While the demand from the foundries is small at present, cast scrap is about as firmly held as anything on the list, except wrought pipe, on which new specifications of such a rigid character have been made by buyers that dealers are much stiffer in their views as to prices since they face the danger of larger rejections than heretofore. Dealers' quotations, per gross ton, New York and vicinity, are as follows:

Rerolling rails	$10.50 to $11.00
Old girder and T rails for melting	10.00 to 10.50
Heavy melting steel scrap	10.00 to 10.50
Relaying rails	20.50 to 21.50
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track scrap	11.00 to 11.50
No. 1 yard wrought, long	10.50 to 11.00
No. 1 yard wrought, short	10.00 to 10.50
Light iron	5.00 to 5.50
Cast borings	5.50 to 6.00
Wrought turnings	5.50 to 6.00
Wrought pipe	9.50 to 10.00
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.50 to 10.00
Locomotive grate bars	8.50 to 9.00
Malleable cast	12.00 to 12.50

Metal Market

NEW YORK, December 21, 1910.

THE WEEK'S PRICES

Cents Per Pound.

	Copper.			Lead.		Spelter.	
Dec.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
15	13.00	12.75	38.17½	4.50	4.35	5.85	5.75
16	13.00	12.75	40.00	4.50	4.35	...	...
17	13.00	12.75	....	4.50	4.35	...	...
19	13.00	12.75	....	4.50	4.35	...	...
20	13.00	12.75	38.45	4.50	4.35	5.75	5.65
21	13.00	12.75	37.90	4.50	4.35	5.75	5.65

Pig tin continues high, but is in small demand. Copper is listless and weak. Spelter has slumped. Lead is very quiet.

Copper.—The demand for copper is very limited. Consumers are buying but sparingly and are shopping about considerably with the idea that they can obtain concessions. It is hard to tell precisely what sellers are doing, but it is known that prices are weak, and considerable shading has been done. Copper producers are delivering metal which was ordered last month for December and January delivery, but they are booking little in the way of new orders. Most of the open quotations made in this market name lake copper at 13c. and electrolytic at 12.75c. The London market closed to-day with spot copper selling at £56 18s. 9d. and futures at £57 3s. 9d. The sales amounted to 500 tons of spot and 250 tons of futures. The market closed steady.

Pig Tin.—Consumers of pig tin here are entirely at the mercy of the London syndicate, which is in control of the market. Business here is very dull, but notwithstanding that the price of tin for spot delivery continues high. The quotations here follow the London fluctuations closely, and as stocks are rather scarce it appears that American consumers will be obliged to pay according to the London operators' dictation for the next few weeks at least, no relief being looked for until there are better shipments from the East. Yesterday there were offerings of pig tin at 38.35c., but no buying was reported at that price. As a matter of fact, consumers are taking the metal in very small quantities. In New York to-day pig tin was sold for 37.90c. The London market closed with spot tin selling at £172 5s. and futures at £172 12s. 6d. The sales amounted to 120 tons of spot and 770 tons of futures. The market closed firm.

Tin Plates.—The market is very quiet. Stocks are plentiful, but the price continues firm at $3.84 for 100-lb. coke plates.

Lead.—There is very little buying at this time, but the present position of lead is attracting considerable attention because of an announcement made by a representative of the leading interest to the effect that the production has been materially reduced within the last six months. It is hard to decide whether the recent advance in the price of lead was caused by a growing demand or came about because of an arbitrary decision to raise prices made by the leading interest. Just now lead is held at 4.50c. in New York and the price in St. Louis is 4.35c. The leading interest is in control of the situation in this market, but in St. Louis outside sellers are making the price.

Spelter.—The spelter market is very uncertain. There is little demand, and it is apparent that there are some large holders who are anxious to realize. What caused the break in the market is not known, but it is generally conceded that the tacit agreement which seems to have existed between the leading producer and the larger sellers has been broken. The metal can now be bought in this market at around 5.75c.

Antimony.—Cutting continues and Cookson's is quoted at a very low price. Sales have been reported at 7.30c., but the usual price for Cookson's is 7.62½c. Hallett's can be bought at around 7.75c. Chinese brands are selling at 7.25c. and Hungarian grades can be had as low as 7c.

Old Metals.—The market is of a holiday character and not enough business is being done to establish exact quotations. Dealers' selling prices are nominally unchanged, as follows:

	Cents.
Copper, heavy cut and crucible	12.50 to 12.75
Copper, heavy and wire	11.75 to 12.00
Copper, light and bottoms	11.00 to 11.25
Brass, heavy	8.25 to 8.50
Brass, light	7.00 to 7.25
Heavy machine composition	11.25 to 11.50
Clean brass turnings	8.00 to 8.25
Composition turnings	9.00 to 9.50
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.30 to 4.40

Metals, Chicago, December 20.—The demand has slackened for the metals, but a fair amount of copper has been sold, deliveries running into March. The railroads are steady buyers. Spelter is weak and the recent sharp decline has encouraged buyers to wait. The fluctuations in tin do not make much change in the Chicago price. We quote Chicago prices as follows: Casting copper, 13c.; lake, 13⅛c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 39c.; small lots, 41c.; lead, desilverized, 4.45c. to 4.50c., for 50-ton lots; corroding, 4.70c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.60c. to 5.65c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c., in small lots; sheet zinc is $7.75, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10½c.; copper clips, 12c.; red brass, 11c.; yellow brass, 9c.; lead pipe, 4¼c.; zinc, 4¼c.; pewter No. 1, 24½c.; tin foil, 30c.; block tin pipe, 33c.

Metals, St. Louis, December 19.—Lead is quiet and held at 4.37½c. to 4.40c.; spelter is easier and quoted at 5.45c. to 5.50c., both at East St. Louis. Zinc ore is weaker and quoted at $39 to $41, Joplin base. Tin is held at 38.90c. per pound; antimony (Cookson's), 8.10c.; lake copper, 13.30c.; electrolytic, 13.20c., all at St. Louis. The demand for finished metals the past week was moderate in volume. The leading manufacturer reports sales to date for the year of 4,100,000 lb. of coffin hardware metal, cast of Pittsburgh.

Iron and Industrial Stocks

NEW YORK, December 21, 1910.

The stock market has been exceedingly dull, transactions having been much lighter than during the previous period. Fluctations have been within narrow limits. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.	8¼ - 8⅛	Railway Spr., com.	31⅛ - 32
Allis-Chalm., pref.	27 - 30	Railway Spr., pref.	92 - 92⅛
Beth. Steel, com.	29 - 29¼	Republic, com.	30⅝ - 31
Beth. Steel, pref.	59 - 59½	Republic, pref.	93½ - 94½
Can, com.	9⅛ - 9⅜	Sloss, com.	49½ - 50
Can, pref.	75⅝ - 77¼	Pipe, com.	15⅝ - 16¼
Car & Fdry, com.	49½ - 51⅛	Pipe, pref.	52 - 53½
Steel Foundries	42½	U. S. Steel, com.	71⅞ - 73¼
Colorado Fuel	31¼ - 32	U. S. Steel, pref.	116¼-116⅞
General Electric	153⅜-157	Westinghouse Elec.	66½ - 68½
Gr. N. ore cert.	55½ - 58	Am. Ship, com.	75
Int. Harv., com.	111 -112	Chi. Pneu. Tool	40½ - 42
Int. Harv., pref.	121¾-122½	Cambria Steel	42 - 43
Int. Pump, com.	40½ - 40⅞	Lake Sup. Corp.	26¾ - 28⅝
Int. Pump, pref.	84¼ - 85	Pa. Steel, com.	60
Locomotive, com.	36½ - 37½	Pa. Steel, pref.	104 -104½
Locomotive, pref.	106	Warwick	10 - 10¼
Nat. En. & St., com.	16	Crucible St., com.	12⅛ - 12⅞
Pitts. Steel, pref.	100½	Crucible St., pref.	75⅝ - 77
Pressed St., com.	29⅝ - 31	Harb.-W. Ref., com.	32¼ - 32½
Pressed St., pref.	93½ - 94	Harb.-W. Ref., pref.	94½

Crucible Steel Company of America.—The treasurer's report covering the quarter ending November 30, 1910, is as follows:

Gross profits:		
September	$259,259.57	
October	390,520.08	
November	372,979.47	
		$1,022,759.12
Deduct appropriations:		
Depreciation and repairs	$337,970.03	
Contingencies	20,543.68	
		358,513.71
Net profit applicable to dividends		$664,245.41

The net profit shown above, compared with that of the previous quarter, of $643,664.83, is an increase in favor of the present quarter of $20,580.58.

At a special meeting of the Niles-Bement-Pond Company it was voted to extend the date of redemption of the preferred stock until the first Monday of January, 1921. The preferred stock was previously subject to call in 1911 at 105.

Dividends.—Dividends on iron and industrial stocks have been declared as follows:

Otis Elevator Company, quarterly, on preferred, 1½ per cent., payable January 16.

American Locomotive Company, quarterly, on preferred, 1¾, January 21.

Shelby Iron Company, 2½, January 10.

Galvin Machine Company, semiannual, preferred, 3½, January 3.

Riehle Brothers Testing Machine Company, annual, 6, and extra, 1.

American Radiator Company, quarterly, common, 2, December 31.

American Smelting & Refining Company, quarterly, preferred, 1¾, January 3, and quarterly, common, 1, January 16.

American Shipbuilding Company, quarterly, preferred, 1¾, January 15.

Canadian Westinghouse Company, quarterly, 1½; extra, 1, payable January 10.

La Belle Iron Works, quarterly, 2½, December 31.

McCrum-Howell Company, quarterly, common, ¾, January 1, and common stock dividend, 50 per cent., January 30.

National Enameling & Stamping Company, quarterly, preferred, 1¾, December 31.

Niles-Bement-Pond Company, quarterly, common, 1½, December 20.

Railway Steel Spring Company, quarterly, preferred, 1¾, December 20.

Republic Iron & Steel Company, quarterly, preferred, 1¾, January 1.

Standard Coupler Company, common, 2, December 24, and semiannual, preferred, 4, December 24.

Standard Screw Company, common and preferred, 3 January 1.

Western Electric Company, two months, 1 1-3, and extra, 2, December 31.

Westinghouse Air Brake, quarterly, 2½; special, 1, and extra, 1½, January 10.

Notes on Prices

Rope.—Some manufacturers and jobbers find that current business is about equal to that of December a year ago, while others are not experiencing so large a demand. Buyers who in times of activity order by the carload find half or a quarter of a car sufficient for their requirements. Jute rope prices are higher owing to the very firm market on jute fiber. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manilla of the highest grade, 8¾c. to 9¼c. per pound; second grade manilla, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¾c. per pound; second grade, 6¼c. per pound; jute rope, ¼-in. and up, No. 1, 6¼c. to 6¾c. per pound; No. 2, 5½c. to 6c. per pound.

Linseed Oil.—The demand is light, as usual at this season, although it had been expected that manufacturing consumers would continue buying, as they had no stocks of oil on hand, because of the hand-to-mouth policy pursued by them for some time. Prices for jobbing lots remain unchanged, while April to September deliveries are quoted at much lower figures. Considerable foreign flaxseed and linseed oil has recently arrived in this country. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
State, raw	93
City, raw	93

Linseed, in lots less than 5 bbl., 1 cent advance per gallon.
Boiled oil, 1 cent advance per gallon.

Spirits Turpentine.—Business at this point is light and orders are for comparatively small lots. At Savannah, receipts have fallen off, and exporters are taking about all turpentine received. This, more than demand, is sustaining the New York market. New York quotations in five-barrel lots are as follows:

	Cents.
In oil barrels	78½
In machine barrels	79

Less than 5-bbl. lots, ½ cent advance per gallon.

Bolts, Nuts and Rivets.—At a recent meeting of the manufacturers of bolts, nuts and rivets, no changes were made in the discounts of carriage and machine bolts, lag screws, and nuts and rivets. So far as the volume of business is concerned, the output is moderate and to satisfy immediate wants the mills working almost entirely on old contracts rather than new business.

The Keefe Sectional Steel Tank.—The American Oil Storage Company, 74 Broadway, New York, has purchased the invention and patents of A. J. Keefe relating to flange sectional plates used in the construction of steel tanks for storing solids and liquids, and intends to begin their manufacture at once. These plates are of uniform size and are bolted securely, instead of being riveted. It is claimed that a tank so constructed has not only five times the strength needed to insure absolute safety and long life, but that it can be installed anywhere by experienced labor in one-half the time of a riveted tank at a total cost of about 2 per cent of the price of the tank. It also can be taken apart and again installed elsewhere without damage to the material. To meet the immediate needs of the crude oil industry, the company will at present manufacture these tanks in large capacities only, from 6000 to 50,000 bbl. each. H. B. Logan, president of Dossert & Co., New York, solderless cable connectors, well known in electrical circles, is president of the American Oil Storage company.

Steel Corporation Bonus.—The plan of annual bonus distribution among United States Steel Corporation employees is announced. The total this year is $2,700,000, as against somewhat more than $2,000,000 a year ago. Sixty per cent. of the bonus will be in common stock, at $70 a share, and 40 per cent. in cash. Employees have the opportunity also of subscribing for preferred stock at 114 and for common at 70, about 25,000 shares of each being available. Last year these subscriptions were on the basis of 124 and 90, respectively, for preferred and common.

Canadian Harvester Manufacturers Secure an American Plant.—The Massey-Harris Company, Toronto, Canada, having factories at Toronto, Brantford and Woodstock in Ontario, and being the largest manufacturer of harvesting machinery and agricultural implements on this continent next to the International Harvester Company, has purchased shares amounting to a controlling interest in the Johnston Harvester Company, Batavia, N. Y., from three large estates, in which this controlling interest has heretofore been vested. It is announced that there will be no change in the management of this company or in its policy in conducting its American trade.

The Tata steel plant in India, known as the Kalimati Steel & Iron Works, will be able, it is now stated, to furnish steel rails and structural shapes by the beginning of 1912. Pig iron can be produced by the fall of 1911. The company has a guarantee of 20,000 tons of rails a year from the Indian State Railways.

The Buckeye Iron & Brass Works, Dayton Ohio, has just made a shipment of three cars of oil mill machinery to Marseilles, France. It is to be used for the manufacture of peanut oil, enlarging the plant of the buyer, to whom the same manufacturer furnished considerable machinery about a year ago.

The Swedish Crucible Steel Company, successor to the Olson Adjustable Plow Point Company, Milwaukee, Wis., has opened a temporary office at Room 48, Rowland Building, Detroit, Mich., which it will occupy until its new factory in Detroit is completed.

The net car surplus, as shown by the statement of the American Railway Association, increased by 10,849 cars between November 23 and December 7, the total on the latter date being 53,915. One year previous the total was 57,470 cars.

A Large Spokane Hydroelectric Plant

The Washington Water Power Company, Spokane, Wash., which is erecting a large hydroelectric power plant, consisting of four units on the Spokane River, at Little Falls, about 28 miles northwest of Spokane, now has three of the units in operation, while the fourth is being installed. The power station consists of a reinforced concrete building in which are installed four 9000-hp. double runner, Francis inflow type water wheels, each unit being direct connected to a 5550-k.v.a., 4000-volt generator, revolving at 150 rev. per min. An exciter is mounted on the overhung shaft of each generator, each exciter having exciting capacity for two generators. In normal operation each generator operates in series with a 5550-k.v.a., 3-phase transformer, stepping up from 4000 to 63,000 volts. Any transformer may be operated on any generator, or the four may be operated in multiple on the low tension or the high tension side.

The speed of the water wheels is controlled by a governor, operated by oil under 150 lb. pressure. The water wheel gates are of the swing gate type, and are operated by a single acting oil engine, the oil pressure being furnished by a triplex pump driven from the water wheel shaft, which also furnishes the pressure for operating the governor. The governor has electric control from the switchboard, as well as a hand operating device from the wheel room floor. Aluminum cell lightning arresters are used for the 63,000-volt transmission lines, which at the present time are three in number. Two of these are direct to Spokane, and the other is a line feeding what is known as the Big Bend country to the south and west of Spokane, furnishing power for operating flour mills, interurban railways, and lighting and sundry small powers in the various towns in the district.

The dam is of solid concrete, and, together with the natural falls, gives an operating head of 73 ft. The plant is connected with the company's system in Spokane by a two circuit aluminum transmission line supported on steel towers placed an average of 750 ft. apart. The aluminum cables are held by suspension type insulators, with towers of such hight that the distance from the earth to the lowest wire is 40 ft. at the tower. The top of the towers carry two steel cables, which are grounded at each tower for lightning protection. The transmission line operates at 63,000 volts, the system being Y connected with grounded neutral.

The Holbeck Riverside Gas Power Company

The above-named company was recently organized with a capital of $1,000,000, and takes over the plant and equipment of the Riverside Engine Company, Oil City, Pa. In addition to continuing the manufacture of gas pumping engines, gas driven air compressors and gas engines for electric lighting and general power purposes, a line of Holbeck gas producers will be made.

The president of the new company is A. A. Holbeck, formerly of Cleveland, Ohio, and patentee of the Holbeck gas producer, which uses any grade of bituminous coal. The producer consists of two large vertical steel drums, one having a charging platform and central opening at the top into which the coal is fed, and the other constituting a scrubber, from which the gas is taken. One of these units was installed and has been in operation for some time at the plant of the Riverside Engine Company, and some interesting tests have been made. These gas plants will be built of various capacities, and are designed to be used in connection with gas engines or to produce fuel gas in sections where natural gas is not available or where any shortage exists, thus making gas engine plants independent and insuring uninterrupted operation.

Besides President Holbeck, the following constitute the officers and incorporators: J. B. Smithman, vice-president and treasurer; A. F. Smithman, secretary; H. S. Smithman and Joseph M Jenckes. The plant of the Riverside Engine Company is of modern and substantial construction, and consists of power plant, machine and erecting shops. The new company will rearrange the present equipment and will add other machinery for the new department later.

New Publication

Qualitative Chemical Analysis. By J. I. D. Hinds, Ph.D., LL.D., professor of chemistry, University of Nashville and Peabody College for Teachers, Nashville, Tenn. Published by the Chemical Publishing Company, Easton, Pa. Pages, vii. + 266. Price, $2.

This book is intended to be both educational and practical. It contains an up-to-date treatment on the subject of qualitative analysis from the standpoint of ions, solubilities and mass action. While it preserves all the excellencies of the old method, it introduces the student to the new view of chemical activities and to the recent explanations of analytic reactions and phenomena. It includes an adequate, though brief, discussion of those parts of physical chemistry which are necessary to an understanding of the processes of qualitative analysis.

Properties and reactions are given with unusual fullness, and the student is expected to become practically so familiar with them that he will be able not only to discover what ions are present in the unknown, but also to ascertain definitely what free elements or compounds compose the body under examination. The process of analysis is thus not one of simple routine, but constantly appeals to the student's knowledge of facts and principles, and the correctness of his conclusions depend upon close observation and good judgment.

The classification of the kations is practically that which is found in the textbooks. The grouping of the anions is essentially that given in Boettger's "Qualitative Analysis," but the systematic method for their separation and identification is a new arrangement which it is hoped will be found helpful to the beginner.

There is a complete list of the reagents and of the solutions with the method of preparing them to a given concentration. In addition to the ordinary table of solubilities, there is a table which gives the solubility in water of most of the substances which are met with as precipitates in the course of analysis. There are also tables of ionic conductivities, of the percentage of ionization of the more important acids, bases and salts at various concentrations, and of the international atomic weights. The book closes with a carefully prepared index.

Welfare Work at the Underwood Plant.—At the Underwood Typewriter Company's factory, Hartford, Conn., considerably over 2000 men and girls are employed. Among so many, injuries and illnesses are always likely, so the company has provided two hospital rooms, each having two beds. The rooms are light and attractive, well heated in winter, and there is a connection on one side with the ventilating system so that a change of air is readily provided. Small injuries and complaints can be taken care of by the nurse who is in almost constant attendance, but if a doctor is needed he can be quickly summoned by telephone. Two lunch rooms, one for the men and one for the girls, seat 722 and 232, respectively. The individual seats have backs and swivel on ball bearings. The company furnishes the tables, tableware and kitchen equipment, and a caterer attends to buying, cooking and selling the food. He is restricted to very reasonable prices, the various dishes ranging from 2 1-3 to 10 cents, and a fairly complete meal can be secured for 15 cents.

The Machinery Markets

The machinery trade is looking up in many quarters. There is a better volume of business in the New York market, but orders are scattered. A great improvement is shown in Chicago. More business is coming out there than at any time in the last three months, and some good sales have been closed. While a single tool business is at present being done in Cleveland, some excellent inquiries are out for machinery, which will be purchased after the first of the year. The Lake Shore Railroad is preparing a list, which will be issued in that market shortly. Some good future business is in sight in Cincinnati. However, the automobile manufacturers there and in other centers are practically out of the market. A material increase in business is looked for in Detroit where a number of good-sized contracts are pending. Milwaukee manufacturers and dealers are not quite so busy, except those who make hydraulic power equipment, for which there is an excellent demand. In the Northwest there is a good demand for a diversified line of equipment, and some important developments are pending in the Farther Central West. Inquiries are coming out in better volume in St. Louis and in the Southwest. Hydroelectric development on the Pacific Coast has created a good demand for equipment in that line, and there are some large inquiries out in San Francisco, which it is expected will be closed the first of the year.

New York

NEW YORK, December 21, 1910.

While stock taking is interfering somewhat with business, a better volume of inquiries is coming forward in the New York machinery market and some good orders have been recorded. Business is decidedly better than it was early in the month, and judging from the character of the inquiries out some good trade will develop after the first of the year. Business now being transacted is mostly of a single tool nature and chiefly for replacements. The railroads are buying a tool here and there, but on the whole they are adhering to a strict policy of economy. Men who are familiar with the railroad situation say that not for many years have the railroads in general allowed their shop equipment to become so run down, and many of them will have to become purchasers in the near future if they desire to keep their repair plants in even fair working condition. The shipbuilders along the Great Lakes and on both coasts have been good customers for machinery during the last few weeks and there are a number of good sized orders yet to be closed. The export trade is contributing largely toward the support of the market. Orders are being placed for German and French accounts, largely for machine tools and for special metal working machinery.

The Morrin Climax Boiler Company, 240 Loraine street, Brooklyn, N. Y., has purchased a plant formerly occupied by the West Pulverizing Machine Company, at Mallory and Pollock avenues, Jersey City, N. J. The plant includes an equipped foundry and machine shop and the Morrin Company proposes to occupy it within a week. In addition to making its line of high power boilers, the company will take over the manufacture of the West pulverizing machinery and will do a general machine shop and foundry business.

The American Tobacco Company has been placing a number of orders in this market lately for equipment to be installed in the new Lorillard plant at Marion, N. J. The company has purchased equipment for developing about 2000 hp., as well as a line of machine tools and special tobacco machinery.

The M. E. Blasier Machine Company has been organized at Utica, N. Y., to take over the business of M. E. Blasier, manufacturer of garment pressing and steaming machinery. The company has been incorporated with the following directors: Milton E. Blasier, George W. Sanborn, Frederick A. Klein, Thomas A. Hobbes and Wadsworth Goodier.

The Buffalo Boiler Works, Buffalo, N. Y., has purchased the foundry building at the foot of French street, Erie, Pa., and will establish a branch manufacturing plant there. The company will make a specialty of boilers, tanks and smokestacks and will do a general repair business in that line.

The Hessler Foundry & Mfg. Company has been incorporated at Oswego, N. Y., to engage in a general foundry business. The company will make a specialty of turning out gray iron castings.

Endicott, Johnson & Co., shoe manufacturers, Endicott, N. Y., have prepared plans for an extensive addition to their plant, the building and equipment of which will be rushed to completion as rapidly as possible.

The New York Central Railroad Company has completed plans for a roundhouse to be built at the Salina yards, Syracuse, N. Y. Geo. W. Kittridge, chief engineer, New York.

The Elmira Water, Light & Railroad Company, Elmira, N. Y., is having plans prepared for a new reservoir of 4,000,000-gal. capacity, with power house installation of two 8000-gal. pumps, with a 30-in. cast iron pipe line from the filtered water reservoir and a 30-in. cast iron pipe line across Hoffman Creek.

The Nichols & Wright Motor Company, Buffalo, N. Y., has been incorporated, with a capital stock of $300,000, to manufacture motors, engines and other motor appliances for motor boats, automobiles and aeroplanes. The incorporators are Chas. G. Hornung, W. R. D. McQuarrie and B. Knox. The new company will take over and continue the business of the Wright Motor Company, now located at South Division and Ellicott streets, and later will build and equip a new and larger plant.

The Frontier Electric Railway Company, which is to construct an electric railroad between Buffalo and Niagara Falls, a distance of 25 miles, has filed plans and profiles with the clerk of Erie County showing a power house and a number of steel bridges and viaducts to be constructed.

The Wagstaffe Company, Ltd., Hamilton, Ont., which has established a branch fruit preserving plant at Buffalo, now located in temporary quarters, has plans in preparation for the building of an extensive canning plant in the latter city next spring.

The plant of the Fredonia Heating Company, Fredonia, N. Y., was completely wrecked December 15 by the simultaneous explosion of two of its boilers, and the Buffalo, Lake Erie & Western Traction Company's power house adjoining was extensively damaged. The aggregate damage to the two plants, both new and recently equipped, will amount to about $40,000. The plants will be immediately rebuilt.

The New York State School for the Blind, Batavia, N. Y., will build a refrigerating plant from plans and specifications of Franklin B. Ware, State Architect, Capitol Building, Albany. Sealed proposals will be received by Dr. F. Park Lewis, president Board of Managers, 454 Franklin street, Buffalo, N. Y., until January 4.

The Cohoes Rolling Mill Company, Cohoes, N. Y., has acquired additional factory space which it will equip as a pipe threading shop. Additional storeroom space will also be provided in the new building.

Catalogues Wanted

The George G. Veness Mfg. Company, Malden, Mass., desires catalogues from manufacturers or dealers supplying the following: Can making machinery, sheet metal working dies, bending machines, solder, agate ware, enameled ware, enameling, aluminum coated sheets, sheet aluminum, sheet metal machinery, power and hand punches and shears, power presses and dies, tinplate, tinners' supplies and machinery.

Chicago

CHICAGO, ILL., December 19, 1910.

December had a poor beginning, but is turning out a fair month in the machinery trade, as a good deal more business is coming forward than in the preceding three months. Most of the pending business is in the form of inquiries which will not be closed until after the first of the year. In many cases buyers explain that they are getting prices and data to be submitted to their directors in January, and whether purchases will actually be closed then will depend to a great extent on the business outlook at the time. Some good sales, however, have actually been closed this month, and a little improvement in the financial world in January, which would encourage buyers, would bring a very satisfactory amount of business to the point of actual purchases.

The automobile trade does not offer any encouragement in that line, as the automobile manufacturers have generally

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cut their shop orders to one-half the product that they had under way a year ago, although a few of the strongest companies expect to make 75 per cent. of last year's product. Their distributing trade is congested with second-hand cars, and it is problematical how much new business there will be, probably not a great deal in the cities, but the farmers may continue as liberal buyers as they were last year.

The new building code in Chicago, recently adopted by the City Council, requires the use of machine mixed concrete in all buildings erected with this material. While the use of concrete mixers has become quite general among contractors, the fact that it is now required by law in this city will undoubtedly promote the use of these machines throughout the country.

The Board of Public Works, Chicago, will in the near future install two electrically driven pumps at the Twenty-second street water station at a cost of $60,000.

The City Council of Stanford, Ill., is preparing to establish a water works system at a cost of $7000.

The Wabash Railroad is having plans prepared for rebuilding its machine shop at Decatur, Ill., which was recently destroyed by fire.

The Big Four Railroad has awarded to the Murphy Construction Company, East St. Louis, Ill., a contract for the construction of a power plant at Mattoon, Ill., to be erected at a cost of $20,000. The plant will be housed in a building, 65 x 100 ft. The contracting company is in the market for brick work, mill work, structural steel and castings.

The flour mill at Stewardson, Ill., owned and operated by John Patterson, was destroyed by fire December 8, causing a loss of $9000.

The Allen Mill & Elevator Company's feed mill at Decatur, Ill., was burned December 9, causing a loss of $20,000, of which $13,000 is covered by insurance.

Philadelphia

PHILADELPHIA, PA., December 20, 1910.

The few sales reported are largely single tool propositions. Very little in the way of new business comes from the railroads; in fact, inquiries for the general run of machine tools is gradually falling off, but this is not unusual at this season. Machine tool builders report little change in the situation, although order books are probably not in as good shape as they were a month or so ago, as deliveries have been heavier than incoming orders. Builders of heavy engines state that they have recently been able to close some of the pending business, and, while plants are still being operated considerably under normal capacity, they have more work ahead than was the case a few months ago. There has been very little export demand; the little inquiry has been confided to special equipment. With the easing of the general demand for tools and equipment, a decrease in requirements for castings, both iron and steel, is reported, and foundries, as a rule, are not very actively engaged.

J. J. Harpel, Macungie, Pa., states that the recent damage to his foundry by fire will aggregate $5000, the pattern house, engine house, warehouse and foundry all being partly destroyed. The plant is to be immediately rebuilt and equipped.

The Fairbanks Company has been appointed selling agent in Philadelphia territory for the Toledo Bridge & Crane Company, Toledo, Ohio, manufacturer of hand power and electric cranes for all purposes.

Frank Salomon, the new general manager of the Otto Gas Engine Works, has under consideration plans which include a reorganization of the manufacturing and business departments. Betterments in manufacture will be given particular attention.

The contract for the new garage to be erected for the Packard Motor Car Company, at Broad and Wood streets, has been awarded to Cramp & Co., contractors. The building will be 71 x 168 ft., seven stories

The Pennsylvania Equipment Company, West End Trust Building, is in the market for 25 to 50 second-hand full power hopper self-cleaning wooden coal cars, 60,000 to 80,000 lb. capacity.

Proposals will be received until January 17, 1911, by the County Commissioners of Schuylkill County, Pa., for a general contract, including increased water supply, sewage disposal plant, power plant, elevators, heating, ventilating, plumbing and electrical work complete, for the construction of a building for the insane at Schuylkill Haven, Pa., in accordance with specifications, copies of which may be obtained at the office of Charles T. Straughn, County Controller, Pottsville, Pa. At the same time proposals will be opened for the general construction of the building.

The Auto Car Company, Ardmore, Pa., is having plans prepared by Stearns & Castor, engineers, for a two-story brick, steel and concrete addition, 56 x 220 ft. This building will be used for general manufacturing purposes, particularly in connection with commercial cars.

The Borough Council of Bristol, Pa., has authorized the Borough Solicitor to advertise for bids for the erection of a municipal water works and the construction of a sewage system.

Cincinnati

CINCINNATI, OHIO, December 20, 1910.

Machine tool traveling salesmen are coming in to spend the holidays and they generally report business as being very light. However, the majority of them agree that there are a large number of orders in sight, which could be booked if a general buying movement could be started with the trade. The railroads continue unsatisfactory customers, and no relief is anticipated from this source until after the rate question is settled. The automobile manufacturers have practically been out of the market for the past few weeks.

A few local foundries are busy, but a larger number of them are having a hard time to keep operating even on short time. Machinery dealers and the supply people are both doing a rather scant business.

The Cincinnati Shaper Company gave a dinner and theater party to its foremen on the evening of December 19. Superintendent March and Secretary Manley of the National Metal Trades Association made informal talks, which were responded to by different foremen.

The J. T. Towsley Mfg. Company, Cincinnati, manufacturer of woodworking machinery, states that its business during 1910 has been excellent, and when the annual statement is made up the company expects it will show up better than for any previous year of its existence.

The Wellsburg Bridge Company is a new incorporation at Wheeling, W. Va., with $100,000 capital stock. The incorporators are A. M. Schenk, J. J. Holloway, C. H. Copp, B. W. Peterson and G. O. Nagle, all of Wheeling. The company was formed to build a bridge across the Ohio River at Wellsburg.

The Foos Mfg. Company, Springfield, Ohio, announces that after January 1 its name will be changed to the Bauer Brothers Company. Chas. L. Bauer will be president, Louis E. Bauer vice-president and W. A. Bauer treasurer.

The John Dietz Mfg. Company, Cincinnati, has recently reorganized and increased its capital stock from $10,000 to $30,000. It has leased the two-story building at 808-810 Elm street, which will be fitted up for manufacturing washing machines. A line of woodworking machinery and other equipment will be needed. The company's present location is 20 Fifteenth street, and its officers are John Dietz, president; J. F. Chapman, vice-president, and N. S. Calhoun, secretary and treasurer.

The Lunkenheimer Company, Cincinnati, gave a beefsteak dinner to its salesmen and officers on the evening of December 16, at which the majority of its outside salesmen were present.

The E. A. Foy Company is a new incorporation at Cincinnati, with $75,000 capital stock, to take over the business of E. A. Foy & Co., manufacturers of lightning rods. It is the intention of the company to move into more commodious quarters next spring, but the location has not yet been selected. The new company's officers are E. A. Foy, president and treasurer, and C. I. Burdge, vice-president and secretary.

The chartering of the Webster Mfg. Company at Tiffin, Ohio, with $1,200,000 capital stock, practically confirms the report that this company will unite with the Tiffin Malleable Iron & Chain Company, as was recently reported. The Webster Company's headquarters are in Chicago, and it is rumored that its large plant at that point may be moved to Tiffin some time next year. Full details are not yet available.

The Roberts Motor Company, Sandusky, Ohio, has recently received a large order from Japan for its portable air compressors.

The Cincinnati Gasket & Packing Company, 1536-38 Plum street, Cincinnati, has its new plant in operation, and expects to make some additions to it early next year.

The D. T. Williams Valve Company, Cincinnati, expects to be established in its new quarters on Spring Grove avenue, Camp Washington, by January 1.

The Dayton Keyless Mail Box Company has been incorporated at Dayton, Ohio, with $5000 capital stock, to manufacture a patented metal mail box. The incorporators are W. H. Cross, Daniel Glaser, Frank West, Monroe Sharritt and Robert Bratton, all of Dayton.

The Hotel Gibson Company, Cincinnati, has been incorporated, with a nominal capital stock of $10,000, and it has been definitely announced that work on a 10-story fireproof hotel will be commenced some time in 1911. The new structure will be erected on the same site now occupied by the hotel in question, and will require a large tonnage of structural steel to build.

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Cleveland

CLEVELAND, OHIO, December 19, 1910.

Business with the local machine tool dealers continues light. Orders are mostly of a current nature for single tools. Some inquiries that came out early in the month for fair lots of tools, however, have resulted in the placing of orders during the past few days for a portion of the requirements. While very few new inquiries are coming out, dealers are receiving calls from quite a number of manufacturers who are looking round for machinery that they may decide to buy soon after the first of the year. The expected large list from the Lake Shore Railroad for its new shops at Elkhart, Ind., has not yet appeared. This list is nearly completed, but as yet it is uncertain when it will be given to the dealers. There is a moderate demand for second-hand machinery.

Some local manufacturers, however, say that the outlook is better than a few weeks ago and that they expect a good volume of business during the early part of 1911. This is true of turret machinery, for which inquiries have improved. Some local manufacturing plants are running at nearly full capacity, while others are not making much more than one-half of their usual output.

John W. Seaver, engineer, Cleveland, has received a contract from the Didier-March Company, New York, for reversing valves and operating mechanism for the new coke oven plant of the Bethlehem Steel Company. The valves will be reversed automatically by means of air cylinders, the air being applied to the cylinders by magnetic triple valves. The triple valves will be operated by an electrical timing device. Mr. Seaver has also received a contract from the Mount Hope Coke Company, Brownsville, Pa., for a coke quenching machine. Other contracts in connection with the Bethlehem coke oven plant are being placed.

The Ohio Electric Car Company, Toledo, Ohio, has increased its capital stock from $75,000 to $300,000, and in order to increase its output the company is now looking for a site for a new plant, which will probably be built as soon as a suitable location can be found.

The Terminal Warehouse Company, Citizens' Building, Cleveland, is having plans prepared for an eight-story cold storage warehouse, to be built at Canal road and West Third street. It is announced that about $1,000,000 will be spent in the erection of this plant and that work will be started early in the spring. Later a railroad and a terminal warehouse will be built near the cold storage warehouse.

The Allen Mfg. Company, Toledo, Ohio, has placed a contract for the erection of a new factory building. It will be 50 x 100 ft., three stories. The plant will be located at 3007 Detroit avenue.

On account of increasing business the E. A. Pfleuger Company, Akron, Ohio, manufacturer of fishing tackle and hardware specialties, has increased its capital stock from $100,000 to $150,000. No plant extensions are planned for the present.

The Perfecto Mfg. Company, Columbus, Ohio, has been incorporated, with a capital stock of $25,000, to manufacture metal goods. The incorporators are M. J. Killets, C. H. Estey, H. T. Bailey, J. E. Killets and M. C. Welch.

The Board of Managers of the Ohio Penitentiary, Columbus, will receive sealed proposals January 13 for a plenum system of heating and ventilation for that institution.

Swift & Co., who have just completed a large fertilizing plant at Parma, near Cleveland, have let a contract for the erection of a duplicate plant. It will be about 90 x 200 ft. and two stories.

The Holly Mfg. Company, Buffalo, N. Y., was low bidder for two vertical triple expansion pumping engines, each of 25,000,000-gal. daily capacity, for the city of Cleveland, bids for which were received December 12. The company submitted three proposals, ranging from $108,769 to $120,769 for each engine.

Indianapolis

INDIANAPOLIS, IND., December 20, 1910.

The Storck-Browning Company, Indianapolis, has been incorporated, with $100,000 capital stock, to manufacture sewing machines. The directors are J. H. F. Browning, R. L. Storck and W. E. Cary.

The creditors of the Parry Auto Mfg. Company, Indianapolis, which recently went in the hands of a receiver, are discussing plans for overcoming the financial difficulties of the company with a view to its reorganization.

The Diamond Pottery Company has been incorporated at Frankford, Ind., with $12,000 capital stock, to manufacture pottery. The directors are J. C. B. Beatty, G. K. Beatty and W. S. Fisher.

The South Bend Fixture Company, South Bend, Ind., has been organized to manufacture office and storeroom supplies. The directors are H. J. Holland, W. N. Drowley and C. E. Williams.

The Supreme Court of Indiana has made an important ruling to manufacturers. It has decided in a recent case that in a prosecution for using unguarded machinery the indictment must charge and the State must prove that the machinery is capable of being properly guarded without interfering with its usefulness.

The Dean Forging Company, Muncie, Ind., has increased its capital stock by issuing $100,000 of preferred. J. J. Dean is president of the company.

The Citizens' Trust Company has been appointed trustee to settle the affairs of L. C. Giboney, lessee of the Lebanon Foundry & Radiator Company, Lebanon, Ind. It is stated that creditors will realize 75 cents on the dollar.

The new petroleum plant of the Standard Oil Company at Whiting, Ind., which manufactured by-products, was burned December 12, with $75,000 loss.

The Triple Sign Company, Connersville, Ind., has increased its capital stock from $6000 to $30,000. A. C. Rieman is president.

The Rochester Bridge Company, Rochester, Ind., has increased its capital stock from $30,000 to $50,000. W. H. Denniston is president.

The machinery department of the Vonnegut Hardware Company, Indianapolis, Ind., will be moved to the building formerly occupied by the Francke Hardware Company, 43-45 South Meriden street, and will be operated under the name of the Vonnegut Machinery Company after January 1, 1911. The sales organization will include Anton Vonnegut, Charles Rassman and C. B. Williamson.

Fairbanks, Morse & Co. have purchased the factory of the Commercial Electric Company, Indianapolis, Ind. The company is using the factory for manufacturing standard types of electrical equipment.

The Perfection Biscuit Company, Fort Wayne, Ind., has purchased an additional tract of ground, 60 x 150 ft., and is preparing plans for the erection of a building.

The Hill Machine Company, Anderson, Ind., has taken over the plant of the Wilke Mfg. Company, into which it is now moving. The company states that it is not in the market for new equipment, but has quite a lot of second-hand woodworking machinery for sale.

Work is progressing rapidly on the new machine shops of the Southern Railway at Princeton, Ind., and it is expected that the machinery will be installed during January.

New England

BOSTON, MASS., December 19, 1910.

While business in the machinery trade is not brisk, it is not of a flat dullness. Brightening experiences are more numerous, both among the manufacturers and the dealers. In a number of cases the week has brought a much greater volume of orders. Several dealers report a marked increase in sales. One large machine shop is urging the prompt delivery of equipment ordered some months ago, and then held up because of the receipt of many cancellations. A few very good orders have been placed, including close to $10,000 worth of business by the Stanley Company, for the new shops at Salem, Mass., to manufacture gasoline engines. At Greenfield, Mass., the tap and die manufacturers are comfortably busy, and some improvement is noted by the machinery builders of the town. Heavy machinery is not in much demand. One large builder states that while November shipments were the largest for the months of 1910, December's business has been unsatisfactory. It is easy to find all kinds of business experiences, from very good to very bad, which seems to indicate an unsettled rather than a basically dull market.

The National Supply and Machinery Dealers' Association has acted upon the recommendation of the National Machine Tool Builders' Association, and has recommended to its members the adoption of the non-cancellation clause on all quotation sheets and correspondence relative to orders. The New England members in the various cities have been formally notified, and will proceed to act upon the suggestion. While the dealers as a whole are possibly less optimistic than the manufacturers as to securing the rigid adoption of the non-cancellation principle, they believe that the present move is in the right direction, and will bear some immediate fruit and much more in time to come.

The business of the E. F. Reece Company, Greenfield, Mass., manufacturer of taps and dies, has been merged in the F. E. Wells & Son Company of that place, manufacturer of machinery and pipe cutting tools. The Reece corporation will go out of existence, but Mr. Reece will continue as the manufacturing head of the tap and die departments, while S. A. Yeaw of the Reece Company, will probably be made treasurer of the F. E. Wells & Son Com-

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pany. The corporation will erect a factory building in the spring, to give greater manufacturing space for the manufacture of taps and dies. The structure will be adjacent to the present Reece factory, which is some distance from the works of the F. E. Wells & Son Company.

A dispatch states that L. M. Linnell, West Gardiner, Maine, for years interested in mining operations in the West, has acquired the mineral rights of 1000 acres of land in Skowhegan and Canaan, Maine, and will begin mining in the near future for hematite ore.

The improvements planned by the New York, New Haven & Hartford Railroad for 1911, including the Boston & Maine system, will total the expenditure of many millions of dollars. The latest announcement is of $3,000,000 for New Haven, Conn., and vicinity, for a passenger station to cost $1,000,000, a great roundhouse, a pier for passenger and freight steamers, a considerable amount of new trackage, and a big electric generating plant, to be located on Mill River in New Haven, which will supply the power when the main line is completed between Stamford and New Haven. The Boston & Maine should spend $12,000,000 at least, including the electrification of the Hoosac Tunnel, at $10,000,000 in one appropriation, of which $2,500,000 is for repair shops. The report is current that negotiations are on for the purchase by the New Haven interests of the Bangor & Aroostook Railroad in Maine and the Quebec Central in Quebec, which would be important links in the Boston & Maine system, giving it practically a monopoly in the extreme Northeast.

New England is receiving a fresh supply of skilled labor from the Middle West. As a rule these men were attracted from this section by the high wages offered by the automobile builders, and they are returning in the belief that in the long run they will fare better in the East. Toolmakers, who have been almost impossible to get, are applying for work in increasing numbers, and most of them have little difficulty in securing positions. Employers are not releasing skilled labor, and even though their works may not be running full are taking on high class men, in the belief that their services will be exceedingly valuable in the not distant future.

A Connecticut chuck manufacturing company reports November business as being the largest for that month it has ever experienced, and that undoubtedly for the year 1910 it will have done the largest business in its history. The demand, both domestic and foreign, for the last few weeks has been most satisfactory. The company further says that the outlook for business for 1911 is certainly encouraging.

Landers, Frary & Clark, New Britain, Conn., manufacturers of cutlery and hardware, have voted to increase the capital stock from $1,500,000 to $2,000,000. They are not yet ready to state their plans as to the disposition of the new capital.

The National Spring Bed Company, New Britain, Conn., has plans for the erection of a new factory building, as an enlargement of its works. The structure will be 40 x 100 ft., five stories, brick, with top story of steel and a concrete roof. A new boiler house will be 30 x 40 ft.

The Potter & Johnston Machine Company and the Foles & Jenks Mfg. Company, Pawtucket, R. I., and the Woonsocket Machine Company, Woonsocket, R. I., have entered into a selling arrangement and have established agencies in Providence, R. I., and in the South, for the handling of their machinery. The idea is that the textile machinery department of the Potter & Johnston Company and the other two companies produce complete mill equipments, and therefore the consolidation of interests in the sales end must prove of much mutual advantage.

The Potter & Johnston Company, Pawtucket, R. I., is completing a one-story addition to its machine shops, covering some 50,000 sq. ft. of land.

Toronto

TORONTO, December 17, 1910.

General conditions remain as they were. The substantial basis of business is broad and strong, and sentiment throughout trading and financial circles keeps on the side of optimism. Expectations of a steadily continuing demand appear to be general on the part of makers of and dealers in machinery equipment. They look forward to large applications of British capital to the mining fields of the country and to considerable appropriations of that capital to the purchase of plant and outfit. The fact cannot be too often repeated that the buying power that has been the sustenance of the machinery trade is not simply that derived from the soil in the last harvest, but is very largely a contribution of new capital obtained by the sale of securities abroad. If Canadian trade articles of factory equipment, power plant, construction outfit, mining machinery, &c., had no other support than the financial returns of the last crop it would be much less brisk than it has been.

The Montreal Tramways & Power Company has been formed and registered in London, England, with a capital stock of £4,110,000. Its objects are to construct and purchase tramways and street railways in Canada, to equip and maintain these, to manufacture rolling stock and to supply electricity to consumers.

Ely Bros., London, England, manufacturers of small arms, have under consideration a proposal to establish Canadian branch works at Fort William, Ont.

The Superior Rolling Mills Company has most of its plant assembled at Fort William, where it is expected that operations will soon be commenced.

The directors of the Dominion Power & Transmission Company, Hamilton, Ont., have placed an order with the Canadian Westinghouse Company of that city for a new generator, to be installed at the former company's power works at De Cern Falls. The capacity of the generator is to be 8500 hp. and its cost to be $200,000. The power company is also arranging to build another substation in Hamilton. This will cost $100,000.

The City Council of Halifax, N. S., has voted to give exemption from taxation for 20 years to the Nova Scotia Car Works, Ltd., which is to take over the works of the Silliker Car Company. Also the new company is to receive free from the city 5,000,000 gal. of water every year.

Tenders for two fire engines will be received up to December 27 by L. F. Monaghan, City Clerk, Halifax, N. S.

The pulp and paper mills to be established by Price Bros. & Co., on the Rivière au Sable, and for the building of which $5,000,000 has recently been raised by the sale of the company's bonds in London, are to be ready for operation by June, 1912. The new industries are expected to bring into existence at that point a town of 4000 or 5000 inhabitants. A water power development that can be depended on to maintain 14,000 hp. will be begun as soon as possible.

The ratepayers of Victoria, B. C., have ratified the by-law to spend $50,000 on new fire protection equipment account.

The Board of Trade of Calgary, Alberta, is in communication with American inquirers who are considering the establishment in that city of works for the manufacture of gas engines, and of works for the manufacture of stoves and heating apparatus.

The Dowsley Spring & Axle Company, Chatham, Ont., is making extensions of its plant.

The Ottawa Vacuum Cleaner Company, Ottawa, Ont., with a capital stock of $150,000, has been formed to manufacture electric portable vacuum cleaners and permanent installation cleaners.

Application has been made to the Provincial Secretary of Ontario on behalf of the Timmins-McMartin-Dunlop Syndicate for a charter for a milling, concentrating and refining company of $500,000 capital stock. The name of the company is to be the Porcupine Gold Mining Company. It is proposed to erect at once a mill having 30 stamps at the outset, and so built as to enable its capacity to be easily increased upon demand. Besides working on the ore of the mining interests associated in the company the plant will be used on custom business.

Henderson Bros., of Bruton, England, have decided to establish a factory in Ottawa for the manufacture of hair cloth machines and patent horizontal saws.

The Beaver Board Company of Buffalo, N. Y., has purchased land in Ottawa upon which to erect a factory for the making of a fireproof boarding to take the place of lath and plaster.

St. Louis

ST. LOUIS, December 19, 1910.

Business from the standpoint of actual orders placed in the machine tool line has been quiet, but a number of fairly good deals are pending, and it is hoped to see December make a fairly good showing in the end. Numerous small manufacturing plants are starting up, and a number of the established plants are taking advantage of the lull to put in more equipment, against the resumption of business looked for in some degree after the turn of the year.

It is reported that the Fulton Iron Works will build a new plant. This company, whose specialty is sugar mill machinery, has been greatly rushed with work for several years, and its present quarters are regarded as entirely inadequate.

The American Brake Company is pushing work on its large additions, and some of the new equipment is beginning to arrive. This plant will be built a model of its kind. Among other tools purchased are five steam hammers, including two of 4000 lb. each.

The Frank Adam Electric Company, maker of switchboards, junction boxes, &c., is very busy, and has been for a year or more.

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The Commonwealth Steel Company, now employing a large force of men in its steel foundry at Granite City, continues extremely busy on its patented passenger car platform specialties.

The Heine Safety Boiler Company keeps its large new plant on the Terminal Belt Line busy, and is now making deliveries from it as far East as Pittsburgh. Deliveries east of that point are handled by the Pennsylvania plant of the company. St. Louis is the headquarters.

The Stupp Bros. Bridge & Iron Company, St. Louis, has ordered a Pauling & Harnischfeger traveling crane for outdoor yard service.

The McQuay-Norris Company, St. Louis, has leased the building at 1311 Chestnut street. The company will engage in the manufacture of leakproof piston head packing rings for all types of automobiles, marine and steam engines and pumps.

The Foss Valve & Brass Mfg. Company, St. Louis, has been incorporated. The capital stock is $50,000. The incorporators are Clarence E. Anglin, Wm. J. Gates, G. Howard Willett, and others.

The American Tin Company, St. Louis, has been incorporated with a capital stock of $10,000. The incorporators are Nelson W. McLeod, W. E. Grayson and M. A. Dees.

The Reinforced Rail Joint Company, St. Louis, has been incorporated, with a capital stock of $8000. The incorporators are Harry F. Roach, John Gallop and Mary G. Roach. The company will engage in the manufacture of rail joints, machinery, &c.

The Willsville Light, Power & Water Company, Willsville, Mo., has been incorporated, with a capital stock of $15,000. The incorporators are C. H. Early, J. T. Mitchell, E. R. Barrett and others.

The new plant of the Hubbard Mfg. Company, Texarkana, Ark., manufacturer of hoops, was destroyed by fire December 3. The company announces that the factory will be rebuilt at once.

The Faultless Mattress Factory, Birmingham, Ala., will locate a branch plant at Russellville, Ark. The city donated a 2-acre site.

The J. A. Scott Mfg. Company, Helena, Ark., has been incorporated, with a capital stock of $50,000. The incorporators are J. A. Scott, W. A. Archer and R. L. Sheetz. The company will manufacture lumber.

Plans are being made to rebuild the Roberts Cotton Oil Company's mill at Jonesboro, Ark., recently destroyed by fire.

It is reported from Irondale, Mo., that plans for a hydroelectric plant, to furnish power for traction purposes, are being drawn by James P. Ward.

Pittsburgh

PITTSBURGH, PA., December 20, 1910.

With the close of the year so near at hand trade in this district is very light, so far as any orders for the immediate future are concerned. For the coming spring there is a great deal of work in prospect and considerable estimating will be done soon after the holidays. Little, however, can be said about the various projects known to be under way, even when the facts are reasonably certain. A policy of secrecy is being generally maintained by the larger interests involved, and when anything leaks out it is flatly denied.

In the campaign for new industries about to be inaugurated here an effort will be made to secure the location in Pittsburgh or vicinity of a number of automobile factories, particularly those manufacturing commercial vehicles of the heavier types. It is believed that nearness to the sources of the best supply of material, abundance of skilled labor and the rapidly growing local demand for such machines will be factors of considerable importance in the success of such establishments.

A feature of the fall and early winter trade has been the demand for grinding machinery, the call for which continues much better than in other related lines. All of the smaller sizes are being largely stocked by hardware dealers, general stores, &c., throughout the country, while the belt or motor driven tools for machine shops and factories sell to excellent advantage, both directly and through machinery dealers.

With the opening of spring trade the Pittsburg Emery Wheel Company will have manufacturing facilities practically doubling the present capacity of its plant. The necessary additions to buildings and equipment are now being provided for.

Additional machinery to improve the efficiency and increase the capacity of the high pressure pumping system of the McKeesport, Pa., municipal water works is needed there, according to recommendations made by the Board of Fire Underwriters, and steps will be taken in the near future by the local authorities to provide the necessary equipment.

Improvements in its power and lighting system are to be undertaken by the Kanawha Water & Light Company, Kanawha Falls, W. Va.

J. B. Shepherd, Pittsburgh, heads the newly organized Woodlawn & Southern Street Railway Company, which has been chartered to build an interurban line through Beaver County.

The American Axe & Tool Works, McKeesport, Pa., is increasing the capacity of its shops by an addition now under construction.

The Brookville Water Company, Brookville, Pa., will purchase pumping units and electrical machinery, compressor, &c., to be driven from power furnished by gas engines, for its water supply system. Contracts covering the outside work have already been let to the Pitt Construction Company, Pittsburgh.

The Williams Gauge Company, Pittsburgh, which maintains a selling organization in many parts of the country, has had a favorable year in the manufacture and marketing of various steam specialties, including traps, governors and feed water regulators. With the power plant improvements and the new construction known to be impending for the coming season the outlook for business is bright.

To provide for the growth of its business and increased facilities the Charleroi Foundry & Machine Company, Charleroi, Pa., has increased its capital stock.

The Tennis Company, Pittsburgh, with offices in the Magee Building, is reported to be in charge of plans for the new York & Glen Rock Railway Company, which will build an electric traction line from York to Loganville, Pa. No definite time for awarding contracts for construction work, line material or equipment appears, however, to have as yet been determined upon.

Manufacturers here will figure within the next few weeks on machinery and auxiliary apparatus, including generating sets, condensing system, pumps, boiler plant, &c., for a new power station to be erected by the Capital Traction Company, Washington, D. C. The complete plans have not yet been worked out, or at least approved.

New foundry buildings to be erected in this State, in which equipment houses here are taking an active interest at present, include a plant to be built for the General Foundry Company, at Bradford, Pa.; a foundry building for the Philadelphia & Reading Railway at the east side of the old pattern shop in Reading, Pa., and an addition to the foundry of the Ridgeway Machine Company at Ridgeway, Pa. The plans of the first of these are now being finished, the contract for the second has been awarded, and work on the third is under way. All are good sized structures.

Detroit

DETROIT, MICH., December 20, 1910.

Owing to the enormous quantity of concrete work, road building, track ballasting, &c., in prospect for the coming spring, there threatens to be a scarcity of crushed stone, and the owners of plants supplying that material are very generally making preparations for increased capacity. The opening months of 1911 should by all present signs be among the best ever known for the sale of quarrying, conveying, crushing and screening machinery in Michigan and northern Ohio and Indiana, where some of the best limestone deposits in the country lie. The same is true, although to a less extent, of cement making plants. It involves, however, a line of equipment so extensive as to affect favorably many separate branches of the machinery trade.

The Newaygo Portland Cement Company, Grand Rapids, Mich., will provide for increased manufacturing facilities, including the installation of one or more additional electric power units.

Reports that a new plant consolidating the business of the Grand Rapids Book Case Company, Grand Rapids, Mich., and the Barber Chair Company, Hastings, Mich., would be erected are apparently premature. A merger of the two companies has been effected, but each of the factories will be separately maintained and possibly enlarged.

The Crabill Hose Clamp Company, said to be composed of Chicago interests, has been incorporated at Battle Creek, Mich., but definite information in relation to its plans has not been given out.

It is reported from Saginaw, Mich., that the Saginaw Wire Fence Company has been organized there, with $10,000 capital stock, and will operate a manufacturing plant.

Plans for a municipal electric plant to furnish power and lighting service will soon be carried into effect at Muskegon, Mich.

A steam power and pumping plant, air compressor and drilling machinery are being installed on the property of the Detroit New Ontario Gold Mining Company, Matheson, Ont., the ownership of which is vested in local interests.

A bond issue of $20,000 has been placed at Horner,

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Mich., to provide for the construction of a pumping plant, water and sewage systems.

The plant of the Owosso Motor Company, Owosso, Mich., will not be closed down as a result of receivership proceedings, but will continue to turn out light delivery trucks on contracts already taken. It is reported that the company will be reorganized on a stronger financial basis and some additional manufacturing facilities are likely to be provided before spring to meet the demand for the company's product.

Nearly 4000 men are now employed in the works of the Buick Motor Car Company, at Flint, Mich., and the output of cars decided upon for 1911 is reported to have been already oversold. An increase will, therefore, probably be provided for.

Extensive improvements and repairs will be made in the plant of the Burt Portland Cement Company at Eaton Rapids, Mich., which has been closed down for the purpose. The past year is reported to have been the best in the company's history.

The Calumet Chemical Works has been organized with $100,000 capital stock, to establish a manufacturing plant at Escanaba, Mich.

The Midland Machine Company, Detroit, has had an excellent trade this year in screw machine parts, special tools, jigs, &c., and the prospect in these lines for the coming season is good.

The system of power distribution to be established by the Manistee County Electric Company, whose headquarters at present are in the Houseman Building, Grand Rapids, Mich., will include a large hydroelectric plant and an auxiliary engine or steam turbine operated plant, the latter to be erected in Manistee, Mich. Plans and specifications are now being worked out by the company's consulting engineer, Daniel J. Albertson, Kalamazoo, Mich.

The Detroit Edison Company, Detroit, is proceeding with plans, mentioned some time ago, for an addition to its West Jefferson street power house.

Smith, Hinchman & Grylls, Detroit, have let the contract for the foundations of the Buhl Malleable Company's new steel foundry. Provision for the equipment is now being made, a list of considerable size having been given out to be figured on.

The Havers Motor Car Company has been organized to establish an automobile plant at Port Huron, Mich.

The business of the Beach Mfg. Company, Charlotte, Mich., has been incorporated with $100,000 capital stock. In addition to its large plant at Charlotte the company also operates branch plants at Grand Forks, N. D., and Portland, Ore., which are separately incorporated companies.

The Bates Tractor Company, Lansing, Mich., has been organized with $200,000 capital stock by M. F. Bates of the Bates & Edmonds Motor Company of that city. The company will manufacture gasoline tractors, and expects to build a plant in Lansing, and is now considering a number of locations that are available.

The Northern Engineering Works, Detroit, reports a large increase in sales of the Newten cupola, among which are one 6-ton to the Middleby Auto Company; one 12-ton, Modern Foundry Company; one 6-ton, Dake Engine Company; one 1-ton, Washington University; one 5-ton, Michigan Crucible Steel Castings Company; one 12-ton, Southern Iron & Steel Company.

Milwaukee

MILWAUKEE, WIS., December 19, 1910.

One contract of large size, for hydraulic power machinery, was received here last week from the Pacific Coast, and some buying was done on account of new tannery buildings in Milwaukee, but general trade has not been brisk. The month of December will, however, average fairly well as compared with previous seasons. From present indications considerable buying will develop all through the State by the latter part of January. From other industrial centers of Wisconsin, as far as Superior in the extreme Northwest, the reports received are most encouraging. Despite the dull condition of trade in general local shops have been well filled with work. Most of those devoted to the manufacture of machinery or other mechanical or electical appliances make a feature of certain patented specialties which can be disposed of with a minimum of sales effort, and for these the aggregate demand is sufficient right along to insure the steady operation of their plants.

A notable example of this here in Milwaukee is the business of the Cutler-Hammer Mfg. Company, which has developed a line of electric controlling devices that are in constant demand. From the character of its trade one would have no evidence of the dullness prevailing in most lines of equipment during the fall months, as a very satisfactory volume of orders has been received.

Fred Frotenrath, manager of the American Machinery & Construction Company, Milwaukee, millwright, is arranging for the construction of a two-story factory building at 593 Island avenue.

The water works system at Rhinelander, Wis., will probably be taken over by the city and enlarged. The present equipment of the pumping station includes motor driven centrifugal pumps, two-stage, built in the shops of the Allis-Chalmers Company, Milwaukee.

Joseph Obenberger & Son, Milwaukee, have postponed until the late winter or early spring the construction of the addition to their forge shop.

The contract for heating apparatus to be installed in the first of the new buildings of the Minnesota Steel Company has been let to the American Heating Company, Superior, Wis.

Bonds covering the installation of the proposed water works system have been voted at Prescott, Wis.

The installation of an electric lighting plant is under consideration at Maiden Rock, Wis.

The municipal water works and electric power plant at Menasha, Wis., which is equipped with generators driven by Diesel oil engines, will probably be enlarged by the addition of a unit similar to those already installed. No definite purchase has as yet been authorized, the matter being still in the hands of the City Council.

A repair shop is to be provided for in the new building being erected at Marshfield, Wis., by the Marshfield Hardware & Auto Company.

A steam and electric power plant, with motors for driving the machinery, will be included in plans for a large new paper mill, to be built by the Lakeside Paper Company, recently organized by E. J. Lachmann of Neenah, Wis., and others. Its location is to be Menasha, Wis.

In connection with its timber cutting plant at Boyd, Wis., the Boyd Lumber, Land & Improvement Company will install planing mill machinery at some time during the present winter.

Wisconsin builders of hydroelectric machinery will bid on equipment for a large plant, to be erected in the vicinity of Marseilles, Ill., by interests identified with the Northern Illinois Light & Traction Company. The construction will be in charge of L. E. Myers Company, Chicago, Ill., who arranged for the building of the Northern Hydro-Electric Company's large generating station at High Falls, Wis., which is the most important hydraulic power development in this State.

The plant which the Endeavor Electric Light & Power Company, Endeavor, Wis., is planning to build will be located at Valders, Wis. The company's headquarters are at Endeavor, Wis.

It is reported from Appleton, Wis., that a manufacturing plant will be erected there by the Imperial Knitting Mill Company, recently organized.

The La Crosse Commercial Association, La Crosse, Wis., is endeavoring to secure the location in that city of the Reliance Engine & Iron Company, now building gas and gasoline engines in Racine, Wis. The company is doing an excellent business there, but has an unsatisfactory site, without side track facilities, and is stated to have been considering a change.

The Continental Realty Company, which operates a large electric power plant in Milwaukee, will construct three substations equipped with transformers.

A substation equipped with power transformers and other electrical apparatus will be built in Superior, Wis., by the Great Northern Power Company, Duluth, Minn., and a transmission line run directly from the 40,000-hp. generating station of the company at Thomson, Minn.

The Nordberg Mfg. Company, Milwaukee, has opened a district office at Butte, Mont., where quarters in the Lewisohn Building were recently secured. Victor Nordberg will be in charge as the manager of sales for that section.

The Board of Public Works, Wausau, Wis., has been authorized to have plans prepared and detailed specifications drawn for a new electric power plant, to be operated by the municipality.

The Murphy Boiler Company, 153 Barclay street, Milwaukee, has been incorporated for $10,000 by J. C. Murphy, A. J. Weidner and Samuel A. Connell.

John F. Conant, 510 Terrace place, Milwaukee, is the buyer of the Two Rivers Woodenware Company's plant at Two Rivers, Wis.

A new riveting system has been installed by the J. I. Case Threshing Machine Company, Racine, Wis., the equipment being furnished by the Hanna Engineering Works, Chicago, Ill.

The Water-Clarke Company, Superior, Wis., is about to proceed with the erection of an addition to its woodworking plant.

The Milwaukee Electric Railway & Light Company, Milwaukee, is installing in its Commerce street power house two steam turbine sets of 7500 kw. and two of 14,000 kw., furnished by the General Electric Company, Schenectady,

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N. Y. Corresponding additions will be made in the boiler house and the auxiliary apparatus, both at this time and later on.

The Badger State Machine Company, Janesville, Wis., whose products include punches, shears, bending rolls and woodworking machinery, has on hand at present a large volume of business, with very satisfactory prospects for the new year.

A modern plant, equipped with woodworking and power machinery, will be erected in Milwaukee by the Layton Park Woodwork Company, whose factory was destroyed by fire.

The Reliance Wrench Mfg. Company, 1508 State street, Racine, Wis., has been incorporated with $25,000 capital stock. The company will contract for the manufacture of its wrench for the present, but expects to erect a plant some time in January.

The Universal Mfg. Company, Racine, Wis., has filed articles of incorporation with $25,000 capital stock. The company will manufacture steering gears for motor cars and trucks, automobile parts and machine specialties.

San Francisco

SAN FRANCISCO, December 14, 1910.

Considering the lateness of the season, the general machinery market appears to be in fair condition. No large volume of orders is being booked, and none was expected at this time, but several large inquiries have recently come out for equipment to be purchased after the first of the year. Plans for a large increase of equipment are being made by many industrial and development companies, and the outlook is favorable for a period of considerable activity during the spring. Dealers feel encouraged by the fact that current business continues on about the same scale as for some time past, the year-end curtailment in some lines being compensated by an improvement in others.

Machine tool business is confined almost entirely to orders from small machine and automobile repair shops in outside towns, all large purchasers being inclined to hold off until January. The automobile repair trade has been a factor of some importance in the season's business. Some large installations are to be made, however, during the next six months, and if the railroads come into the market again the movement should be about up to normal. Many substantial orders have already been booked for delivery next year of contractors' and railroad equipment, dredging machinery and the like, and manufacturers in these lines are preparing to increase their output.

One of the principal installations in prospect is for the new shops at South San Francisco for Norman B. Livermore and others. Mr. Livermore is Western representative of the American Locomotive Company, Atlantic Equipment Company, Ransome Concrete Machinery Company and others, with offices in the Metropolis Bank Building. After the first of the year a new company will be incorporated, of which he will be president, absorbing the Mutual Engineering Company of San Francisco. A site of 12 acres has been secured at South San Francisco, and contracts have been let for the erection of a machine shop 100 x 400 ft. and a car shop 100 ft. square. The shop will be equipped for general locomotive and railroad repairs, and the manufacture of freight cars, logging equipment and suction dredge machinery. In addition to the equipment from the old shops, new tools required will include several large boring mills, tire-turning lathes, planers and complete outfits for a boiler shop, forge shop and woodworking shop. The shop is expected to be in operation within 90 days, and sufficient work is already under contract to keep it occupied for several months. The Norman B. Livermore Company will have the selling agency for this plant, as well as for the lines already represented.

Arrangements have been made by which the Yuba Construction Company, Marysville, Cal., will act as agent for the Bucyrus Company, covering the Pacific Coast, including Alaska and British Columbia. The Yuba Construction Company has a large business in the manufacture of hulls and small machinery for gold dredges, both for California and Alaska.

Several good orders have recently been placed by mining interests, both in California and Nevada. The mines along the mother lode in California are developing rich ore at a low level, and are planning more new equipment than for several years past. Arrangements are being made for pumping out many old mines, and the installation of new hoisting and pneumatic machinery. Most of the business from this source will be withheld until spring, as delivery is impossible during the winter, but large inquiries have increased rapidly in the last month. A number of orders for stamp mills, &c., are expected from Alaska mining concerns.

A lot of Chicago pneumatic drills has just been shipped to Alexander & Baldwin of Honolulu.

There is an active movement of second-hand machinery, the demand being principally for steam and gas engines and contractors' equipment.

Emil Koenig is preparing to establish a new foundry at Upland, Cal.

A new building is being erected for the machine shop of Angell & Redit at Anaheim, Cal.

F. S. Granger, promoter of an electric railroad between Fresno and Hanford, Cal., announces that a power house will be installed at a cost of $100,000, near Fowler, Cal.

The Northern Electric Company is planning to install repair shops on its new terminal site at Sacramento, Cal.

The California Ornamental Iron Works has been incorporated at Los Angeles, with a capital stock of $25,000, by G. A. Anderson, E. H. McGinnis and O. S. Lieb.

The Swayne Lumber Company, Stanwood, Cal., will install a lot of new machinery during the winter.

J. V. Kunze, Atlantic manager for the Pelton Water Wheel Company, is visiting the San Francisco offices.

The American La France Fire Engine Company of California has been incorporated in San Francisco, with a capital stock of $20,000, by R. S. Chapman, G. M. Alitzer, W. T. Barnett, A. D. Plaw and E. T. Zook.

The Destructor Company, 111 Broadway, New York, has taken a contract for two garbage incinerators for San Francisco, at $255,216. Each plant is designed for disposing of 120 tons of mixed refuse in 24 hours.

The G. W. Price Pump & Engine Company, San Francisco, has started the manufacture of a new line of traction engines, called Price's centipede tractor.

New sawmill machinery will be ordered to replace that recently destroyed by fire in the mill of the Goldfield Consolidated Mining Company, near Manhattan, Nev.

A pumping plant is to be purchased for a municipal water system at Tehachapi, Cal.

The Church Water Company, Riverside, Cal., has ordered from the Smith-Booth-Usher Company, Los Angeles, a pumping plant with a capacity of 450 gal. per min. on a lift of 350 ft.

Local shipbuilding plants, as well as those on Puget Sound, have considerable work on hand, principally repairs. This business has been increased by the heavy coastwise lumber traffic, and by the unusually large number of marine accidents which have occurred this fall. Little important new construction is coming up.

Dealers in machine tools hope that provision will be made during the short session of Congress for the needed improvements at the Mare Island Navy Yard, which requires a number of large tools. They believe that some definite action will result within a year or two from the recommendation by Secretary Meyer of the construction of a government drydock on deep water in San Francisco Bay, which would require the installation of a subsidiary marine repair shop.

The Los Angeles Gas & Electric Light Corporation, Los Angeles, Cal., is having plans prepared for extensive improvements. It is understood that the improvements include a steel gas holder to contain 6,000,000 cu. ft. of gas.

A company with a capital stock of $100,000, and of which J. M. Brennan is president, is establishing a shoe factory at Upland, Cal., which will commence operations with an initial capacity of 250 pairs of shoes daily. Machinery used for operating power will probably consist of one 12, one 25 and one 30 hp. gas engine, the rate for electric current being so high as to be prohibitive.

Hunt, Eager & Burns, Los Angeles, Cal., have prepared plans for a children's hospital to be erected at a cost of $75,000 and equipped with an electric light plant.

The Northwest

ST. PAUL, MINN., December 19, 1910.

The contract for pumping machinery to be installed in the water works at Minneapolis, including two motor driven centrifugal pumps of 20,000,000 gal. each, has been placed with the Henry R. Worthington Company, New York City. Some auxiliary apparatus will be purchased later as required.

The Cramer Bros. Company, Polson, Mont., will enlarge its power plant and install resawing machinery in the mill.

It is proposed at Egan, S. D., to install a pumping plant for serving the community, and a definite decision in the matter will be reached before spring.

A steel tower and tank will probably be purchased soon after January 1 at Easton, Minn.

The municipal authorities at Huron, S. D., have engaged L. P. Wolf, St. Paul, to plan and supervise the improvement of the local pumping system.

A bond issue of $20,000 for the installation of water works will be voted on at North Mankato, Minn.

A bond issue for the improvement of the pumping plant

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and water distribution system has been voted at Lake Preston, S. D.

For service next spring the city of Madelia will have a new steel tower and tank added to its water system.

The Butte Electric Supply Company, Butte, Mont., has been reincorporated under the laws of the State of Utah and its capital stock increased from $50,000 to $250,000.

The South

NASHVILLE, TENN., December 19, 1910.

The demand for machinery is scattering, with no particular trend to buying, which consists mainly of small orders from every branch of industry in the South. Contracts for important public works are being generally held in abeyance until after the holidays, for the reason that it is difficult to get decisive action on the part of official boards. A great deal of purchasing has been held back from divers causes, and so much of it is coming to be really necessary that relief must be afforded soon after the new year begins.

Work is now well under way on the new shops of the Louisville & Nashville Railroad at Boyles, Ala., which will include 10 new buildings of steel and concrete construction.

The Houma Lighting & Ice Mfg. Company, which has in its power plant a General Electric generator of 150 kw. driven by a Hall engine, together with modern refrigerating machinery, will enter shortly upon extensive additions and improvements. The company is located at Houma, La.

Considerable new equipment will be required in connection with construction work to be undertaken next February or March by the Cullman Coal & Coke Company on an industrial road from Cullman to Juliana, Ala.

Having obtained the approval of the State Railroad Commission, the Wofford Shoals Light & Power Company, Cornelia, Ga., will issue bonds and increase its capital stock to provide for the completion of its power generating and distribution system. Lighting service and industrial power are to be furnished a number of communities in the vicinity from alternating current generators driven by water turbines.

The Columbian Iron Works, Chattanooga, Tenn., has developed an excellent trade among municipalities and companies operating water systems in a patented meter box of its manufacture, for which there is a steadily increasing demand.

Alternating current motors for machinery drive are to be installed by the Greenville Mantel & Novelty Company, Greenville, S. C.

The installation of a large mechanical filtration plant is under consideration by the municipal officials at Henderson, Ky., in accordance with recommendations recently made by an expert.

J. H. Yates, Herndon, Va., is reported to be planning the erection of an electric power plant in that vicinity.

The Oliver Electric & Machine Company, Birmingham, Ala., in addition to installing complete power plants, makes a specialty of designing electrical machinery to fit particular requirements, and undertakes the rebuilding or repairing of apparatus. Samuel W. Oliver is president of the company.

J. H. Bridges, Henderson, N. C., has been engaged by the city of Warrenton, N. C., to make recommendations for a municipal pumping plant.

The Alabama Railway & Electric Company, whose plans for power plant equipment were recently mentioned, will probably proceed with the work early in the coming year. It is reported to be under the direction of R. W. Snyder, Allen Building, Birmingham, Ala.

The Carolina Crushed Stone Company, organized by H. G. Thomas, Columbia, S. C.; F. C. Ford, Charleston, S. C., and G. T. Franklin, Banby, Va., has bought the quarry and crushed stone plant of the T. A. Heise Stone Company, and will install machinery, enlarging its capacity to 500 tons daily.

Electric motors will be used for operating the machinery in the new plant of the Central of Georgia Guano Company, at Milledgeville, Ga. The equipment required has already been largely provided for, but some of the details are still to be settled upon.

From Richmond, Ky., it is reported that Louis Herrington and others of that place are organizing a company to build a hydroelectric plant in the vicinity of Danville, Ky., to furnish power and lighting service.

The Fayette Lighting Company, recently organized at Lexington, Ky., is having plans prepared under the direction of A. H. Peck, general manager, for a large electric power plant to serve that community.

A project supported by the Board of Trade of Stone Mountain, Ga., is under way to build an electric railway to Atlanta, Ga.

A bond issue of $250,000 has been voted by the stockholders of the Sayre Mining Company, Sayre, Ala., for the purpose of making extensive improvements, including the installation of a new electric light plant.

The Birmingham Aeroplane Company has been incorporated at Birmingham, Ala., with Jesse W. Alexander of Owenton, Ala., as president. The company expects to build a plant for the manufacture of an aeroplane on which it holds patents.

The Thornhill Wagon Company, Lynchburg, Va., whose plant was recently burned, has increased its capital stock to $300,000 and will build a plant of double the capacity of that destroyed. The machinery equipment has not yet been purchased.

The Decatur Fertilizer Company, Decatur, Ala., has been organized, with $10,000 capital stock, to manufacture fertilizer in a building already erected. Tracy W. Pratt is president of the company.

Texas

AUSTIN, TEXAS, December 17, 1910.

Good rains have fallen during the past week in many parts of the State, breaking the long drouth, and causing a general improvement in business conditions. The shortage of water supply which was beginning to be seriously felt in a number of towns in North Texas and the Panhandle country is relieved, at least temporarily. The plans for developing an increased supply and wider distribution of water, which were necessitated by the drouth, will be carried out in a number of towns, to provide for any future emergency that may arise.

Charles S. Downing of Kansas City, Mo., will construct a large system of irrigation, including the installation of pumping plants, upon a tract of land which he owns near Fort Stockton, Texas. He has already arranged for watering about 7500 acres. The proposed irrigation system will cost in the neighborhood of $500,000, it is said.

The Northern Produce Company, Cuero, Texas, will install an ice plant at that place.

J. A. Clay, general manager of the Durango Electric Company and the San Juan Water & Power Company, has been investigating the situation at Farmington, N. M., with the view of extending the electric power transmission lines of his interests to that locality for the operation of irrigating pumping plants and other power purposes. It is reported that he will also take over the Farmington electric light plant.

The demand for pumping machinery in the Del Rio, Texas, irrigated district is constantly increasing.

The Temple Lumber Company is installing a large machine shop at Pineland, Texas.

The sawmill and planer at Alexander Switch, Texas, which were recently purchased by R. K. Coke and W. H. Savage from the Alexander-Hardee Lumber Company, will be remodeled and enlarged. Considerable new machinery will be installed.

The Hardy Oil Company, which is laying an oil pipe line from the Markham oil field, near Markham, Texas, will install a pumping plant.

The Seco Pressed Brick Company has been organized at D'Hanis, Texas, with a capital stock of $40,000. The incorporators are F. Rothe, August C. Rothe, Joe Ney and others.

The Huasteca Petroleum Company, a subsidiary of the Mexican Petroleum Company, Los Angeles, Cal., will erect three oil storage tanks, one at Tampico, Mexico, with a capacity of about 1,000,000 bbl., another at Juan Casiano, Mexico, and the third at San Geronimo, Mexico, the combined capacity of the latter two to be about 600,000 bbl. This company recently finished the laying of a pipe line from the Juan Casiano field to Tampico, 110 miles, and is delivering oil through it at the rate of about 25,000 bbl. per day. On the route of this line were erected four pumping stations, each station costing about $100,000. The same company has a concession from the Mexican Government for the construction of a line from its oil fields in the gulf coast region to the City of Mexico, a distance of several hundred miles. It is now obtaining the right of way, preparatory to beginning construction work.

Tennison Brothers, Houston, Texas, have under construction a building containing 10,000 sq. ft. of floor space, which will be used as a factory building for the manufacture of eaves troughs, conductor pipe, metal shingles, cresting, well casing, stove pipe, irrigating pipe, &c. They have been operating a similar factory at Texarkana, Ark., for a number of years, but, owing to the low freight rates and better shipping facilities, it was decided to locate a factory at Houston to supply the Southwest, Louisiana and East Texas trade.

Machinery of the most modern type, including the new pneumatic system of operating trimmers, with motor-driven compressor, &c., will be furnished by the Giddings & Lewis

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Mfg. Company, Fond du Lac, Wis., for the new mill of the Waterman Company, which is to be erected at Blocker, Texas. A large band mill, steel carriage and resawing machinery will also be features of the equipment.

New bids on equipment for the proposed water works improvements will be taken at Dennison, Texas, where the tenders recently made were rejected.

Shaw Brothers' Ice & Fuel Company, Fort Worth, Texas, has been incorporated. with a capital stock of $40,000. The incorporators are Albert Shaw, Gus Shaw, William Shaw and George Shaw.

Plans are now under way for the construction of a water works system at Princetown, Collin county, Texas. The company has already been organized, with J. W. Godwin as president, J. H. Stinson vice-president, C. A. Wilson secretary and treasurer.

A fire December 6 destroyed 24 self-loading pockets and the entire hoisting machinery of the Trinity & Brazos Valley Railroad yards at Teague, Texas, causing a loss of $30,000.

The Powell pumping station of the Fort Worth water works, Fort Worth, Texas, was destroyed by fire December 8, causing a loss of $50,000 on the building and machinery.

The Swift Cotton Oil Mill Company's plant at Grandview, Texas, was destroyed by fire December 7, causing a loss of $50,000, fully covered by insurance.

Work has been started on the buildings to be occupied by the Port Lavaca broom factory, Port Arthur, Texas. The buildings include operating room, warehouse and bleaching room.

The Southwest

KANSAS CITY, MO., December 19, 1910.

Current trade continues fair, being about normal for the pre-holiday season, and a nice line of inquiries has developed upon which considerable business is expected to be closed in January.

Dickinson & Watkins, Little Rock, Ark., have been engaged by the city of Portland, Ark., to prepare plans for an electric power and pumping station, work out the complete specifications and supervise the construction.

A new timber cutting plant is to be built at Altheimer, Ark., by the Varner Land & Lumber Company of Pine Bluff, Ark.

A lighting plant and other electrical equipment will be installed in the near future by the Bartlesville Oil Refining Company of Bartlesville and Oklahoma City, Okla.

Construction work will begin in about two months on the line of the Oklahoma City & Ft. Smith Traction Company. Plans are in charge of Joseph Kreis, Oklahoma City, Okla., who is general manager of the company. A power plant will be built in or near the coal fields lying along the route surveyed for the road.

In consequence of the demands made upon its hydroelectric station on Fossil Creek, the Arizona Power Company, Prescott, Ariz., will soon arrange for the construction of another plant. The purchase of equipment is likely to be made very quickly after a definite decision in the matter has been reached.

Contracts for the preliminary work on the new water works system at Ada, Okla., will be let about the middle of January, and the purchase of machinery is to follow.

A new manufacturing plant will be placed in operation this winter at Tulsa, Okla., by the Tulsa Lightning Arrester & Electric Company, recently organized, of which W. J. Stewart has been elected secretary.

The Allin Machine Works, Helena, Ark., has been established to manufacture a hoe patented by W. J. Allin, which has five detachable blades. The company is in the market for drop forgings or steel castings and pressed steel blades or the special tools for making them, also handles and ferrules.

The Commercial Club of Tulsa, Okla., has closed a deal with J. S. King and associates of Des Moines, Iowa, for the installation of a steel and copper cable factory in that city.

The City Council of Manchester, Okla., has under consideration the establishment of a water works system.

Estimates are being prepared by Lamont, Okla., for the construction of a water works system at a cost of $17,000.

An appropriation of $85,000 has been made by Douglas, Ariz., for establishing a water works system.

The Oklahoma Traction Company is building a line to connect Tulsa and Salpulpa, a distance of 15 miles, and is the first interurban in Oklahoma. It is planning a chain of interurbans, one of which will connect with Bartletsville, 50 miles, and another will run to Coweta, 55 miles.

An agreement has about been reached between the Muskogee Industrial Development Club, Muskogee, Okla., and the Sun Ray Stove Mfg. Company of Delaware, Ohio, for the removal of the factory to Muskogee. The Muskogee Development Company will furnish a site and take $10,000 worth of stock in the proposed factory.

The Muskogee Packing Company, Muskogee, Okla, has been incorporated with a capital stock of $150,000. George E. Schneider, N. F. Hancock and F. H. Grubbs of Muskogee, G. D. Sleeper of Rex and T. C. Harrold of Wagoner are the incorporators.

Among companies recently chartered in Oklahoma is the Baker Grate Improvement Company, Oklahoma City, with a capital stock of $25,000. The incorporators are A. P. Crockett, W. F. Baker and George M. Ayers.

Plans are being formed for rebuilding the Kremlin Flour & Alfalfa mills, Kremlin, Okla., recently destroyed by fire.

The Atchison, Topeka & Santa Fe Railroad has let the contract for the construction of the new boiler house at Topeka, Kan. The building will be used to house the boilers furnishing steam to operate the pumps in the 12 new 10-in. wells. The company has also let a contract for the new gas welding plant and when completed will install gas making machinery.

Farther Central West

OMAHA, NEB., December 19, 1910.

One of the features of the coming construction season will be the erection of additional sash and door, flooring and interior woodwork factories at points in this territory where rates on timber from Southwestern or Northwestern and Pacific Coast mills will permit. This means a corresponding demand for the machinery used in such plants, with motors, controllers, electric lighting equipment, &c. The manufacture of cement, lime, plaster and clay products will also be largely increased, as building operations were delayed last season by periodical shortages of construction material, and concrete machinery, crushed rock, cut stone, &c., will also be extensively in demand, necessitating further plant enlargements on these accounts. Taken all in all, the construction work that begins in March or April will be responsible for a considerable aggregate of buying in behalf of the industries of this section.

E. G. Staats & Co., Inc., Mt. Pleasant, Iowa, are enlarging their factory and will install new woodworking machinery.

The power and pumping station and distribution system of the Public Water Company, Ottumwa, Iowa, have been purchased by the municipality and extensive improvements will be entered upon.

For the coming spring the erection of a new manufacturing plant is being planned by the Ottumwa Supply & Construction Company, Ottumwa, Iowa, which, since the fire that destroyed its plant, has been located in temporary quarters.

The plant of the National Lumber, Box & Package Company, Omaha, Neb., will be rebuilt for larger capacity, and woodworking machinery, electrically operated, installed.

An engineer will be engaged shortly by the authorities at Columbus Junction, Iowa, to plan the construction of a power and pumping plant.

Additional power transformers and other equipment for both the main generating plant and a substation at Stanton, Iowa, will be required by the Red Oak Electric Company, Red Oak, Iowa, upon completion of a transmission line to that place.

The Ft. Dodge Light & Power Company, Ft. Dodge, Iowa, which has a plant of about 750 kw. capacity, will probably add to its equipment in the near future, in consequence of a five-year lighting franchise obtained locally.

W. D. Crist, vice-president of C. E. Coon & Co., Brandeis Building, Omaha, will purchase a steel tower and tank, pumping units, cast iron pipe, valves, hydrants, &c., for a water works system which that company is under contract to install at Dorchester, Neb.

The Central Machine Works, Omaha, has been incorporated for $25,000. G. E. Selander and C. G. Bolin are the proprietors.

Pending the location of the main shops of the road, the Denver, Laramie & Northwestern Railroad Company, Denver, Colo., will install repair equipment in a shop at Utah Junction, Colo., where a roundhouse is also being erected.

Estimates covering the construction of water works at Olathe, Colo., have been prepared by an engineering firm of Denver, engaged for the purpose, and the matter will be actively taken up in the near future.

The Hassell Iron Works Company, Colorado Springs, Colo., is rebuilding its plant, recently destroyed by fire.

The Telluride Power Company, Telluride, Colo., has ordered a 1500-hp. Pelton impulse wheel, to operate under 1200-ft. head, with a General Electric generator.

The Fort Dodge Portland Cement Corporation, Fort Dodge, Iowa, has awarded the contract for the construction of its new plant at Gilmore City, Iowa. It is expected to

THE MACHINERY MARKETS

be completed by next summer, and will cost approximately $2,000,000. The rock crushing and power plants will be the first to be completed.

Beatrice, Neb., has under consideration the establishment of a water works system.

The Baker Machinery Company, Des Moines, Iowa, is now occupying its new building and will carry a full line of power transmission goods, mill and foundry supplies, steam and water specialties and mining and clay working machinery. The company has a very commodious factory building equipped for the manufacture of freight and passenger elevators. It will also do special machine and structural work, the new factory equipment enabling any class of mechanical work to be done.

The Waterloo Gas Engine Company, Waterloo, Iowa, is making extensive additions to its plant. The company has in course of construction a building 50 x 300 ft., and expects to build an addition to its general manufacturing plant in the spring which will be 120 x 450 ft. in size.

E. Derby, an Ohio manufacturer, will establish at Marshalltown, Iowa, early in the spring, a factory that is to manufacture a stamping and perforating device to prevent the raising of checks. The heads of the several departments in the present factory are to remove their families to Marshalltown in the near future.

The A. R. Flick box factory, Dubuque, Iowa, was destroyed by fire December 10, causing a loss of $35,000.

The Hastings Foundry & Iron Works, Hastings, Neb., has started the construction of five new buildings that will add 20,000 sq. ft. of floor space to the plant.

North Pacific Coast

SEATTLE, WASH., December 16, 1910.

The chief interest of the larger machinery houses, and particularly representatives of Eastern concerns, is centered in the several hydroelectric power developments that have recently advanced to the stage where machinery needs to be purchased. One contract which has just been placed through the Seattle office of the Allis-Chalmers Company, Milwaukee, calls for two hydraulic turbines that are said to be of the largest capacity of any yet built. Each is designed to produce over 20,000 hp. They will be installed by the Pacific Coast Power Company, whose headquarters are in Seattle, at an electric generating station on the White River, not far from Tacoma. The alternating current generators driven from these turbines will be supplied by the General Electric Company, Schenectady, N. Y., and orders for a large quantity of auxiliary equipment have been, or will be, placed among a number of other concerns. Some of this will not be required until later.

The city of Tacoma will soon call for bids covering the hydraulic turbines, governors, generators, exciter units, power transformers, &c., to be used in the large Nisqually plant, now under construction. Besides the main equipment, there will be a great deal of minor apparatus to be purchased in connection with this project.

The Central Power Company, Pe Ell, Wash., is completing a power dam on the Chehalis River, and will construct an electric plant supplying current to the industries in that vicinity.

A new hydroelectric power development, with pumping station, at Loomis, Wash., is reported to form part of the plans of the Whitestone Irrigation & Power Company, recently chartered under the law of this State.

Construction work is now in progress on the line of the Dalles Street Railway, The Dalles, Ore., equipment for which will be purchased early in the coming year, as needed.

The Olympic Power Company, Seattle, has just completed plans for a 25,000 hp. power plant near Port Angeles, on the Elwah River, which is intended to eventually produce 75,000 hp. Transmission lines are to be extended over a wide territory, in order to furnish lighting service to various communities and operating power for local industries.

The Portland Railway, Light & Power Company, Portland, Ore., is preparing to make further extensive improvements in its system, including the purchase of three large generating units and other machinery for its new Estacado hydraulic power station, and the erection and equipment of new substations. This company will be buying liberally at frequent intervals during the next few months.

A vote is to be taken shortly at Leavenworth, Wash., on a bond issue of $45,000 for water works construction. The estimates include thoroughly modern equipment for the proposed plant.

Plans are understood to be in preparation by A. Baker, superintendent of the Last Chance mine at Northpoint, Wash., to build a large ore concentrating plant on a site recently purchased for the purpose.

At the 300-stamp crushing and amalgamating mill of the Alaska Treadwell Gold Mining Company, Juneau, Alaska, arrangements are being made to install a large number of motors for driving the machinery by electric power. The shafting in use, which is direct driven from water wheels, is not to be displaced, but the one system will supplement the other as operating economy dictates.

The Oregon Railroad & Navigation Company, Portland, Ore., is building a four-stall roundhouse and machine shop at La Grande, Ore., for the repair of locomotives. In addition to the machinery heretofore used in the roundhouse at that point additional tools have been purchased, including a driving lathe, planer and drill presses.

The city of Ellinsburg, Wash., has issued bonds in the sum of $300,000 for the purpose of establishing a water works system.

The Klamath Falls Light & Power Company, Klamath Falls, Ore., has ordered a 1050-hp. horizontal double Pelton-Francis turbine, to be operated under 46-ft. head, with Westinghouse generators.

Government Purchases

WASHINGTON, D. C., December 19, 1910.

The Paymaster General, Navy Department, Washington, will open bids under schedule 3155 December 20 for two direct connected ventilating sets and one set electrical spare parts.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids December 27 for one power pump, schedule 3099.

The Constructing Quartermaster, Port Howard, Md., will open bids January 10 for constructing pump house and installing pumping machinery at Fort Smallwood, Md.

The United States Engineer Office, Pittsburgh, Pa., will open bids January 11 for furnishing and installing a water power air compressor plant at lock 1, Monongahela River, Pittsburgh, Pa.

The inspector of the Tenth lighthouse district, Buffalo, N. Y., opened bids December 8 for furnishing one vertical marine duplex pump for the tender Crocus as follows: M. T. Davidson Company, New York, $270; Charles A. Strellinger, Detroit, Mich., $200.

Bids were opened December 13 by the Bureau of Supplies and Accounts, Navy Department, Washington, as follows:

Class 1.—One double service planing machine for Mare Island, Cal.—Bidder 5, American Woodworking Machinery Company, Rochester, N. Y., $1475 and $1700; 56, Eby Machinery Company, San Francisco, Cal., $1940; 61, J. A. Fay & Egan Company, Cincinnati, Ohio, $1855.50 and $2003; 75, Henshaw, Bulkley & Co., San Francisco, Cal., $1730 and $2180; 79, Harron, Rickard & McCone, San Francisco, Cal., $1855.50 and $2003; 118, Manning, Maxwell & Moore, New York, $1543, $1206, $1440, $1595 and $1865; 199, B. D. Whitney & Son, Seattle, Wash., $1645; 200, S. A. Woods Machine Company, Boston, Mass., $2049.50.

British Boilermakers' Lockout Ended.—The lockout of boilermakers, affecting altogether 50,000 shipyard employees of members of the Shipbuilding Employers' Federation in Great Britain, was ended December 14, the men voting almost unanimously to accept the terms of the employers. The lockout began September 2, following a strike of riveters at one yard. The employers' federation contended that this strike was in violation of an agreement for the prevention of strikes and lockouts which the federation had made with 19 shipyard unions. It was decided that the lockout continue until the boilermakers' union was prepared to guarantee the keeping of the agreement. The lockout has cost millions of dollars in wages and has affected nearly all branches of the steel trade.

Shimer & Co., Inc., Philadelphia, Pa., with an authorized capital stock of $5000, have been granted a Pennsylvania charter and will engage in the iron, steel and non-ferrous metal business. Offices have been opened in the Bullitt Building, Philadelphia, and the Frick Building, Pittsburgh, Pa. J. N. M. Shimer, of L. & R. Wister & Co., Philadelphia, is president of the new corporation; H. M. Shimer, vice president; C. E. L. Hatch, treasurer, and William E. Arnold, assistant treasurer and secretary. The new company has been appointed selling agent for the Dunbar Furnace Company, Dunbar, Pa., this business having formerly been conducted by L. & R. Wister & Co.

Lake Superior Iron Mines

Pensions for Old Range Workers—New Properties Being Opened

MARQUETTE, MICH., December 17, 1910.—The operations of the Steel Corporation's pension plan will affect immediately a considerable number of men on the Lake Superior iron ranges. It is estimated that in the Marquette district about 200 men have been in the service of some Steel Corporation subsidiary continuously for 20 years or more, and the age of many of these is upwards of 60. Capt. John McEncroe, Ishpeming, is filling a position of much responsibility, after having been in the employ of the Lake Superior Iron Company for 53 years. The second oldest employee is Peter Raymond, an engineer at the Lake Superior Hard Ore Mine, Ishpeming, who has been on the payrolls continuously for forty-seven years. A number of employees on other ranges are also entitled to pensions.

A fine new "dry" house has been completed at the Steel Corporation's Aragon mine at Norway, Mich. It is 40 x 100 ft., steel framed and brick lined, and contains 360 steel lockers. The entire work of construction, even to the wiring, the plumbing and the installation of the equipment, was performed exclusively by the company's own skilled mechanics.

After an idleness extending back to 1902, the Steel Corporation's Hilltop property in the Crystal Falls district of the Menominee range is to be restored to the active list. It will be provided with a new equipment of machinery, and shaft-sinking will then go forward. The matter of reopening the Cundy mine at Quinnesec is also under consideration.

The Steel Corporation's Section 16 mine at Ishpeming, Marquette range, has been closed temporarily, pending the erection of a steel shafthouse. The men affected have been transferred to other properties.

At Negaunee, on the Marquette range, excellent progress has been made with the unique work of removing the many hundreds of bodies from the old cemetery to the new burial ground, in order that iron mining may be carried on. A considerable portion of the old cemetery is underlaid with ore that will be mined on a royalty basis by the Cleveland-Cliffs Iron Company. On one side of the tract is the Negaunee mine and on the other the still greater Maas mine. The mines are connected by a long drift and through this much of the cemetery ore will be taken out. It is not alone because there are iron deposits that Negaunee's old burial ground is being abandoned, but also because the tract was becoming overcrowded with bodies. In addition to agreeing to pay a royalty on all the ore mined, the Cleveland-Cliffs Company has provided a much larger and better cemetery, and it is paying all the expenses of removal. The whole will amount to $100,000.

The Florence Iron Company has taken an option on the Charles Peterson homestead, 3 miles west of Florence, Menominee range, and is preparing to explore the property. A churn drill and a diamond drill will be operated.

The Volunteer Ore Company, which is opening a mine at Palmer Lake, in the Cascade district, Marquette range, has awarded a contract for the construction of a "dry" house, with accommodations for 200 men. Ore has been hoisted from the shaft for several weeks and by next spring there will be on hand a large stock pile. G. A. Tomlinson, Duluth, is president, and Thos. F. Cole is a director.

Minnesota Developments

A new mine to be developed on the Mesaba is the property of the Ruddy Mining Company in the Biwabik district. Shaft sinking is in progress. The property adjoins the Canton tract of the Steel Corporation and is said to contain a large body of ore. Adjacent is the old Holland mine, where ore running 60 per cent. and better has now been found. Pumping and other machinery are being put into position, preparatory to testing operations on a more extended scale.

The mining headquarters of the Republic Iron & Steel Company have been moved back to Duluth from Pittsburgh, Pa., to which city they were transferred some 18 months ago.

A costly work about to be undertaken by the Duluth & Iron Range Railroad is the rebuilding of the No. 1 ore dock at Two Harbors of steel and concrete at a cost of $1,500,000. The No. 6 dock, a smaller structure, was similarly rehabilitated last winter at a cost of $1,250,000. The remodeled No. 1 pier will be 1390 ft. long and 73 ft. above the water line, and will have a storage capacity of 65,000 tons. Construction work will be started the first of the year. It is expected the dock will be ready for service the latter part of the shipping season.

At Proctor, Minn., the Duluth, Missabe & Northern Railroad has completed a combination machine and blacksmith shop, 90 x 450 ft., and has in construction a car shop 200 x 450 ft. Among the equipment will be traveling cranes powerful enough to pick up and carry a locomotive. Electricity will be furnished by the Great Northern Power Company.

John R. Harrington of Virginia, Minn., one of the owners of the Jack Pot property, near Chisholm, Mesaba range, says that the shaft being put down has already reached a depth of 300 ft., and within two months it is expected to attain the point, 450 ft. down, at which ore was encountered by the diamond drill. A fine grade of ore has been found, and the owners anticipate that it will turn out to be one of the best producing bodies in that section.

The Interstate Company, which is the Minnesota mining division of the Jones & Laughlin Steel Company of Pittsburgh, is about to award a contract for stripping the Longyear mine, 1 mile east of Hibbing, Mesaba range. The removal of 4,000,000 cu. yd. of earth is planned. The work of stripping at Mesaba properties, contrary to expectations some years ago, has increased rather than decreased. Mines that were opened up as underground propositions, and which never were expected to be operated otherwise, have been denuded of their surface drift, and others are to be similarly treated. The stripping at the Susquehanna mine at Hibbing requires the removal of earth ranging in depth from 80 to 150 ft.

The Vanadium Mines Company is an Indiana corporation with a capital stock of $300,000 and owns a tract of land at Engle, New Mexico, on which a deposit of vanadium ore has been opened. An oxide plant is under erection at Cuttex, New Mexico, nearby, which has connections with the Santa Fe Railroad. An abandoned plant at Rankin, Pa., has been secured that is to be equipped with furnaces, &c., for the reduction of alloys. The officers of the company are: A. B. Bennet, president; W. A. Bonitz, vice-president, and C. R. Miller, secretary and treasurer. Offices have been established at 1473 Frick Building Annex, Pittsburgh.

The American Electric Fuse Company, Muskegon, Mich., announces that Fred B. Bonde, its Chicago district sales manager, is now located in room 900, Vogue Building, 290 Fifth avenue, where he carries a complete sample line of Blue Ribbon telephone protectors, Allen-Bradley motor starters, American enameled magnet wire and Americoil ignition apparatus. This is new territory for Mr. Bonde, who has recently been transferred from the St. Paul district.

Customs Decisions

Large Cast Iron Kettles

The status of large cast iron kettles imported under the tariff act of 1909 has been settled by the Board of General Appraisers. The kettles in question are used for chemical purposes. The inner part is enameled with vitreous glass. The custom house officials at New York took the view that the kettles should be classified as "manufactures of metal not specially provided for," with a duty of 45 per cent., under the Payne law. William A. Foster & Co., New York, importers, appealed to the board, their contention being that the correct duty is at the rate of 40 per cent., under paragraph 158, which provides for "other similar hollow ware of iron, enameled or glazed with vitreous glasses."

From a report filed with the board by the appraiser of the port at New York, it would seem that "kettles" are not provided for specifically under the act of 1909. Various other utensils are, however. The local appraiser stated that, as the kettles are not table, kitchen or hospital utensils, he regarded them as dutiable at the higher rate under paragraph 199. The board, however, holds that paragraph 158 applies to other articles than table, kitchen or hospital utensils, and cannot be limited in the manner indicated by the appraiser's report. The claim is accordingly sustained.

Watchmen's Time Detectors

The classification of watchmen's time detectors is the subject of a recent decision by the Board of United States General Appraisers, when a protest filed by the Timekeeper Company and others was construed under the terms of the tariff act of 1909. Under the Dingley tariff act of 1897 the board ruled that similar articles were subject to duty under paragraph 191, the movements at the specific rates according to the number of jewels, plus 25 per cent. ad valorem, and the cases at 40 per cent. In the present tariff act the language of paragraph 192, which corresponds with paragraph 191 of the old act, has included among watch movements such movements as are termed time detectors.

General Appraiser Fischer, who writes the decision for the board over-ruling the protest, says that the articles in question are thus watch movements inclosed in cases. The collector assessed duty on the movements and the cases separately under paragraph 192, tariff act of 1909, the movements as containing not more than 11 jewels at $1.35 each, and the cases at 40 per cent. on their value.

Molders' Patterns

The Board of United States General Appraisers has made a ruling in which it is held that the tariff act of 1909 does not contemplate the free entry into this country of molders' patterns. The identical issue arose under the preceding tariff act of 1897, and after a long and determined fight was decided in favor of the importers. In other words, the Government's right to levy duty was denied. Change in the language of the law enacted last year, however, led the Government to believe that a decision in harmony with its views might be arrived at by the board, and in this it was not mistaken. The protestants in the test case just decided are the International Harvester Company and F. P. Flowers & Co. According to the official papers in the case, the patterns are made either of brass or of wood, and were assessed respectively as manufactures of metal at 45 per cent., or as manufactures of wood at 35 per cent., under the terms of the Aldrich-Payne law. The protestants insisted before the board that the patterns are properly entitled to free entry under paragraph 629. Judge Waite, who writes the decision for the board, points out that the language of the statute has been changed in the free entry provision of the new law and hence the Government's assessment must stand.

Premium Payment for Errand Boys

BY H. M. WOOD,* CINCINNATI, OHIO.

It is poor economy to have a twenty-dollar-a-week man do work which a five-dollar boy can do just as well. That is the reason the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, has messenger boys who run practically all of the errands about the plant. The great saving in a bell-boy system lies in confining the high-priced men to work which really requires their skill. When a machinist wishes to send to the tool room or some other part of the shop, he calls a boy by push button, and sends the boy on the errand instead of leaving his own machine idle. As a secondary saving, there is less time lost in gossiping over next year's pennant prospects, because there seems to be less inclination for a man and boy to have a long confidential chat than for two men.

Fifty push buttons are located throughout the plant, and wired to a hotel annunciator on the wall opposite the window of the tool room. At the annunciator is a bench which serves as headquarters for the boys while awaiting calls. The tool room is chosen for the location of the annunciator, because of its convenient situation, and because most of the calls are to and from the tool room.

Twelve boys comprised the force of messengers at first. They were busy most of the time; at least it was often impossible to get a boy to respond to a call. There was some doubt as to whether there really was need of more boys, or whether the inefficient service was due to proverbial messenger boy slowness. It was therefore decided to try a variation of the premium plan of wages which is giving such general satisfaction for paying the productive workmen throughout the plant. As a basis for determining the premium, it was first ascertained that each boy made an average of about 50 calls a day. This number was therefore taken as a standard, and each boy was allowed ½ cent extra as a premium for each call made per day above the 50. If he should make 50 calls or less, he would get his regular day's pay as before, but no premium.

The number of errands which each boy runs is recorded by the tool room foreman. Each boy is given his individual number; and in the tool room there are 100 punched brass checks about the size of a quarter of a dollar for each number. These checks are strung on wires within convenient reach. When the annunciator indicates a call, the boy next in turn reports at the window of the tool room before answering the ring. The tool room foreman then removes one of that boy's checks from the wire and places it in a rack. If the 100 checks are all used during the day, the fact is noted, and a fresh start made. Each evening it is a simple matter to count the checks to keep tally on just the number of calls which each boy has made during the day. Thus the amount of premium payment is determined.

From the company's standpoint, a very marked improvement in the services was noticed at once. Furthermore, as a few of the boys graduated from their training school as messengers into regular machine shop work, it was found unnecessary to fill their places. To-day eight boys are doing the work which formerly required 12, and the present force is much more efficient. Although each boy makes more money than before, the total bell boy pay-roll is reduced.

From the boy's present viewpoint he sees value of the system in increased wages; he never makes less than formerly and, if he is energetic, he will make half as much again. There will probably be also a future value to the boy in teaching him early that his worth industrially is in direct proportion to the amount of work he accomplishes.

* Lodge & Shipley Machine Tool Company.

Personal

Joseph Monforth, manufacturer of textile machinery, at M. Gladbach, Germany, who has been visiting machinery manufacturers in this country and making purchases of mechanical equipment during the last three months, has returned home, sailing December 13.

J. A. Bennett, formerly mechanical engineer at the Lodge & Shipley Machine Tool Company's plant in Cincinnati, Ohio, has accepted the position of master mechanic of the Studebaker Brothers Mfg. Company, South Bend, Ind.

N. V. Hansell has been in Norway, Sweden and Germany for some weeks in the interest of the American Gröndal Kjellin Company, Ltd., 45 Wall street, New York. Making the tour of European concentrating and briqueting plants with him was Charles E. Herrmann, representing the Gates and other interests operating the Moose Mountain iron mine in Ontario.

F. S. Witherbee of Witherbee, Sherman & Co., New York, has returned from a stay of several months in Europe.

E. W. Oglebay of Oglebay, Norton & Co., Cleveland, will start early in the new year on an extended foreign trip.

John F. Budke, president of the Canonsburg Steel & Iron Works, Canonsburg, Pa., has returned from an extended visit to Hot Springs, Ark.

J. G. Bower has been appointed assistant manager of sales, Western district, for the Pressed Steel Car Company and Western Steel Car & Foundry Company, with office at Old Colony Building, Chicago, Ill., effective January 1.

Robert Wuest, commissioner of the National Metal Trades Association, has returned from a short trip to Bermuda.

E. H. Hargraves, president of the Cincinnati Tool Company, Norwood, Ohio, sailed from San Francisco last week for an extended business trip, to take in the Hawaiian Islands and Australia.

Geo. F. Kissel, with the Cambria Steel Company, Cincinnati, Ohio, has been promoted to the position of special salesman for that company, and will enter upon his new work January 1.

Joseph G. Butler, Jr., was the guest of honor at an informal banquet given at the Union Club in Cleveland, Wednesday evening, December 21. The banquet was arranged by a number of Mr. Butler's intimate associates in the iron and steel trade and was given in celebration of his seventieth birthday. There were about 50 guests present, mostly from Cleveland, Youngstown and Pittsburgh.

R. S. McNight has withdrawn from the Payne & Joubert Foundry & Machine Company, Birmingham, Ala., as general manager, to engage in another line.

A. H. Carpenter, manager of sales for the Southern Iron & Steel Company, with headquarters at Birmingham, Ala., has severed his connection with that company, and on January 1 will engage in other business.

William A. Knapp, treasurer of Sotter Brothers, Inc., boiler manufacturers, Pottstown, Pa., will sever his connection with that corporation January 1, after a continuous service of almost 32 years. Besides being treasurer, the estimating and drafting branch of the work has been very ably and successfully handled by Mr. Knapp for many years. He means to enjoy a much needed rest and his plans for the future are undecided.

W. G. McCune, auditor, has been elected treasurer of the Otis Elevator Company, to succeed the late Lynde Belknap.

George E. Hannah, assistant to the president of the Rogers Locomotive Works before its absorption by the American Locomotive Company, has been appointed assistant treasurer of the Nathan Mfg. Company, 85 Liberty street, New York.

S. L. Parker, formerly assistant general manager of the Chester Steel Castings Company, Chester, Pa., has been appointed New England sales agent, succeeding Frank D. Moffatt & Co., with offices in the Oliver Building, Boston, Mass.

J. W. Carrel, general sales manager of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, will sail for Europe from New York January 5, on a four months' business trip.

Obituary

WALLACE T. FOOTE, JR., of Port Henry, N. Y., died in St. Luke's Hospital, New York City, December 17, after an illness of several months, aged 46 years. He was a son of the late Wallace T. Foote, and was born at Port Henry. He was graduated from Union College in 1885 and from the Columbia Law School in 1888. After practicing law for a few years he turned his attention to other fields of activity. He was a director and officer of Witherbee, Sherman & Co. and president of the MacIntyre Iron Company. In *The Iron Age* of October 14, 1909, an article was printed, in which Mr. Foote's enterprise in opening up Adirondack iron ore deposits was set forth in detail. He was a member of Congress from 1895 to 1899. His wife, who was a sister of Frank S. Witherbee, died in 1896.

PHILIP MEDART of the Medart Patent Pulley Company, St. Louis, Mo., committed suicide December 16 by shooting himself. His health had been failing for several years. He was 72 years old.

STEWART WATT, Barnesville, Ohio, vice-president and superintendent of the Watt Mine Car Wheel Company, died December 10 from pneumonia, aged 65 years. He was born in Noble County, Ohio, and first operated a foundry in 1863. With his brother, who died several years ago, Mr. Watt was the joint inventor of the first self-oiling mine car wheel, and for the last 35 years had been actively engaged in the manufacture of mine car wheels.

MATTHEW KENNEDY, treasurer of the Kennedy Valve Mfg. Company, Elmira, N. Y., died November 26.

The Morgan Engineering Company's Huge Sign

According to sign writers and electricians, the new sign of the Morgan Engineering Company, Alliance, Ohio, is the largest in the country. The sign spells "Morgan," the letters being hung perpendicularly down the side of a tall smokestack. It is legible a mile and a half at night. The sign was constructed by the Dittenhafer Sign Company, Canton, Ohio, and it is fashioned out of the rust-resisting Toncan metal, made by the Stark Rolling Mill Company, also of Canton. Each of the six letters is 8 ft. high; the outline of each is 1 ft. wide, making each letter between 6 and 8 ft. wide over all, while each is from 8 to 10 in. deep. The letters, as rung on the side of the stack, cover a distance of 88 ft. from the top of the M to the bottom of the N. There are 310 electric bulbs in the sign, each of 8 candle power. It is estimated that it will cost the company between $800 and $1000 a year to operate. Toncan metal was used in construction, because it was necessary to find a metal that would withstand adverse atmospheric conditions, resisting rust and corrosion.

The Wabash Foundry & Machine Company, Wabash, Ind., incorporated with $50,000 capital stock, has taken over the plant of the George Barcus Company. The company will do a general foundry jobbing business as heretofore.

National Labor Legislation

Unlikely That Any Measure Will Be Enacted

WASHINGTON, D. C., December 17, 1910.—The programme of the labor leaders for legislation at the present session has been upset by President Taft's recommendations as set forth in his annual message, and the present outlook is decidedly unfavorable for the passage of any labor measure, with the possible exception of the re-enactment of the provision of the last annual naval appropriation bill requiring such warships as may be authorized thereby to be constructed on an eight-hour basis.

The strong pressure brought to bear upon the President to urge upon Congress the passage of the Gardner bill is reflected in the extended attention given to it. Throughuot the campaign of the manufacturers against the Gardner bill the contention has repeatedly been made by shipbuilders that that measure was aimed directly at them and the manufacturers of armor and heavy guns, and the bill has been denounced on that ground as unjust and vicious in principle. The champions of the bill have declared that it covered many other things, and that, except for the "necessary exemptions" contained therein, it was eminently just and fair to all parties having contract relations with the Government. An enactment based upon the President's recommendation, however, would limit the application of the eight-hour principle to shipbuilders and manufacturers of armor and heavy guns, who would thus be singled out for a gross discrimination. There can be no doubt that such a provision covering ships, armor and guns will mean an enormous increase in the cost thereof, to be met by the taxpayer. It is probable that before Congress acts finally on the new naval appropriation bill an attempt will be made to draft a more definite provision regarding the application of the eight-hour law to warships, &c., than was contained in the last naval budget, in order that manufacturers may at least understand more clearly the conditions under which they will be required to operate their plants on the Government work in the event that they decide to compete.

The President's recommendation for the enactment of a so-called anti-injunction law limited to a requirement that no injunction shall be issued in equity without notice to the adverse parties is another disappointment to the labor leaders, who favor a drastic measure which shall provide that no action taken in pursuance of a labor dispute shall be construed as a conspiracy, forbidding judges issuing injunctions from committing violators of their orders for contempt, &c.

This can hardly be pleasant reading for Mr. Gompers and his colleagues. The opponents of all anti-injunction legislation, however, take issue with the President on the ground that, as stated by him in his message, the Federal courts now have the power to give notice of all injunctions issued by them, and ought not to be forced to give notice where the delay involved may be detrimental to the interest of the parties seeking restraining orders. There are may excellent lawyers in Congress who doubt the constitutionality of any provision limiting the issuing of restraining orders, contending that it is essential to the proper adjudication of all such causes that parties committing or threatening a wrong should be promptly enjoined—frequently without notice—in order that the *status quo* may be maintained until the court can hear the case on its merits.

With these considerations in view, and because of the exceptionally heavy calendar of unfinished business and the unusual importance of the annual budget measures, it seems improbable that anti-injunction legislation of any kind will be enacted, or that serious consideration will be given to the Gardner eight-hour bill.

W. L. C.

Niagara Falls' Industrial Advance During 1910

The city of Niagara Falls, N. Y., has made phenomenal advancement in industrial growth during the year now drawing to a close. Many new and extensive manufacturing plants have been added to the Cataract City's already large number of established industries, and a considerable proportion of the existing industrial plants have added largely to their manufacturing facilities in buildings and equipment, making 1910 the greatest year industrially in the history of the city. This statement is the substance of a report made at a recent meeting of the Niagara Falls Board of Trade by Congressional Representative James S. Simmons, who has been compiling data to submit to the Rivers and Harbors Committee during the present session of Congress relative to Niagara Falls' growing industrial importance, to aid in securing favorable action by the Federal Government for the establishment of a harbor for lake and canal shipping at Niagara Falls, above the upper rapids. Mr. Simmons stated that since the first of the year the Hydraulic Power Company has added 20,000 electric horsepower to its output by the installation of two additional generating units; the Niagara Falls Power Company has added 15,000 hp. to its output by improved methods and without diverting one more cubic foot of water than last year; the Canadian Niagara Power Company has added 12,500 hp. in the past 11 months, most of which will be sent to the New York State side of the river; the Hydraulic Power Company has built a transmission conduit to carry 40,000 hp. to the new industrial settlement at the north end of the city, where many of the new manufacturing enterprises are being located. In connection with the improvements being made by the Hydraulic Power Company, Mr. Simmons pointed out the fact that all of the power developed by that company is used in Niagara Falls except only that delivered to the Niagara Gorge Electric Railway, which is partly within the city for its operation.

Included among the more important of the new plants, the construction of which was commenced during the year, is that of the United States Light & Heating Company which will have 17 buildings, now practically completed, with 155,310 sq. ft. of floor space, costing about $400,000, to employ 1000 men at the outset and 2000 later on; the National Carbon Company's plant, steel frame construction, with 148,000 sq. ft.; the Defiance Paper Company's plant on Second street, and that of the Electrode Company on Buffalo avenue. The Spirella Corset Company will commence the erection of an extensive plant on a 5-acre site at the north end of the city early next spring. Among the older companies which have made good-sized additions to their plants during the year are the following: Aluminum Company of America, International Acheson Graphite Company, Castner Electrolytic Alkali Company, Development & Funding Company, Hooker Electro-Chemical Company, Niagara Alkali Company, Shredded Wheat Company and Union Carbide Company. All of the established factories reported increases in their operative forces of from 25 to 350 men.

The secretary of the Industrial Commission also reported that negotiations are being conducted with a number of other large manufacturing concerns using electric power in large quantities, with good prospects for the establishment of plants by them at Niagara Falls.

The Ball & Wood Company, Elizabethport, N. J., has taken a contract for furnishing and erecting for the French Worsted Company, Woonsocket, R. I., a 750-kw. mixed flow Rateau-Smoot turbine and Smoot alternating current three-phase 60-cycle generator, with directly connected exciter, under a general contract with the Rateau Steam Regenerator Company.

Planning the Next Tariff Revision

Revision by Schedules Gathers Strength

WASHINGTON, D. C., December 20, 1910.—The programme of the Congressional leaders for the consideration of the tariff question at the present short session, which has practically been agreed upon during the past week, confirms the statement made in this correspondence a fortnight ago that there will be no attempt at revising the Payne-Aldrich law before adjournment. Nevertheless, the tariff will be a live issue, and important action looking to future revision is likely to be taken by both Houses.

Unexpected developments have followed the presentation to Congress of President Taft's plan for the revision of the tariff by schedules. His project has received the qualified indorsement in the Senate of two such distinguished protectionists as Senator Aldrich of Rhode Island, chairman of the Finance Committee, and Senator Lodge of Massachusetts, both of whom have publicly announced their intention to aid in the movement set on foot by the Republican insurgents, under the leadership of Senator Cummins of Iowa, to pave the way for the correction of crudities and inequalities that may have developed or that may hereafter be discovered in the existing law. Senator Aldrich does not go so far as the President in advocating the revision of the tariff law "by schedules" in the strict sense of that term. He favors revision "by subjects," which he regards as the more scientific method and the only one which is thoroughly practicable. For example, in taking up the metal schedule, Senator Aldrich would have Congress consider not only all those items of the free list relating thereto, but those paragraphs of other schedules which are based more or less upon metal schedule rates. It will be seen, therefore, that the assurances given by the protectionist leaders of the Senate must be accuraely understood to be fully appreciated, and it is also significant that they relate to action by Congress after both Senator Aldrich and Senator Lodge have retired from the Senate.

Measures to Be Considered

Two concrete propositions, however, are receiving consideration by the Republican leaders in the Senate —namely, the amendment of the Senate rules so that any schedule of the tariff may be taken up for action without the danger that it may be amended by the addition of unrelated matter modifying other schedules, and the enactment of a measure creating a permanent Tariff Commission having a larger membership and broader powers than are now possessed by the existing Tariff Board.

At present any tariff proposition that may be brought forward is subject to amendment by the addition of any provision relating to the Federal revenues. Should the proposed changes in the rules be made there will be no parliamentary obstacle in the way of carrying out President Taft's plan for the overhauling of the tariff, schedule by schedule, or in accordance with the modified plan suggested by Senator Aldrich, but it must be obvious that the actual consideration and passage of such separate measures must depend upon the will of the majority, as heretofore. Too much weight, therefore, should not be given to the proposed change in the Senate rules.

The second project looking to ultimate revision, to which Senator Aldrich has already given his indorsement, is the President's plan to enlarge and strengthen the Tariff Commission by making it a permanent board of five or more members with an appropriation sufficient to enable it to extend its researches without limitation either in this country or abroad. Senator Aldrich has publicly assured Senator Beveridge, the author of the pending Tariff Commission bill, that the Finance Committee will report upon the measure before adjournment, and as evidence of his good faith has already called it up for consideration in committee.

Quite as significant as the action of the Finance Committee is the decision of the leaders of the House Ways and Means Committee to give prompt consideration to the President's plan for enlarging and strengthening the Tariff Board. While Chairman Payne and two or three of his Republican colleagues are strongly opposed to the revision of the existing law in the near future, either by schedules or in any other manner, and are disposed to regard the Tariff Board as having as much authority as should be delegated to it, they appear to be ready to yield to the President in the matter, and the committee, therefore, has granted hearings to several members of the House and to a few representatives of business associations advocating a permanent and influential Tariff Commission.

The Democratic Position

The Democratic leaders in the House of Representatives have decided to hold a caucus January 19 to determine on a plan to enact tariff legislation promptly in the first session of the next Congress. Invitations have been sent out to the 76 new Democratic members-elect to be present and take part.

The first step in the plan is to choose the majority members of the Ways and Means Committee, who may meet at once and frame such a general bill as may be deemed expedient, or propose revision by separate schedules. It is believed to be settled that Representative Oscar Underwood of Alabama will be chairman of the new Ways and Means Committee. He has been a member of the minority side of the committee for five Congresses and occupies a position of influence recognized by Democrats and Republicans alike. Mr. Underwood is at this time in favor of a permanent Tariff Commission.

Champ Clark, who will undoubtedly be the new Speaker, has issued a statement in which he says: "It will require months of unremitting and intelligent labor to collect the facts on which to base a tariff bill or bills, as the case may be, such bill or bills as will be wise and just, and such as we are willing to go to the country on." He further says: "Individually, I prefer the scheme of separate bills for separate schedules, taking the schedules with the most obnoxious features first—perhaps in certain cases having separate bills for particular items; but whichever method is decided upon, the Ways and Means Committee will need the same quantity and character of information, for at last a general bill would be made up of the separate bills on all the schedules." It is the evident purpose of the Democrats to force the Senate to act on the tariff by co-operating with the President in the prompt passage by the House of bills revising certain schedules.

W. L. C.

New Railroad Equipment Orders.—The St. Louis Southwestern is reported in the market for 1500 box cars and 500 flat cars; the Chesapeake & Ohio for 200 flat cars; the Wichita Falls & Northwestern for 100 box cars; the Great Northern for 500 all steel ore cars; the Atlantic & West Point for 100 all steel flat cars, and the Chicago, New York & Boston Refrigerator Line for 300 refrigerator cars. At Pittsburgh the Wabash-Pittsburgh Terminal Railroad Company has received authority from the court to buy 2000 steel hopper cars. The Nashville, Chattanooga & St. Louis has ordered 100 box cars from the American Car & Foundry Company, and the Jamison Coal & Coke Company, 400 50-ton hopper cars from the Standard Steel Car Company. The Louisville & Nashville will build 600 hopper and 600 gondola cars at its shops, and the Seaboard Air Line 200 steel underframe cars at its shops. The Boston Elevated has ordered 50 steel

underframe surface cars from the Laconia Car Company, and the Pittsburgh Railway, 50 cars from the Pressed Steel Car Company. Locomotive orders are light, but the leading locomotive interests will be fairly occupied for some time, the one on the recently announced New York Central order for 275, while the other will have a large order from the Harriman lines.

A Permanent Tariff Commission Desired

John Candler Cobb, president of the National Tariff Commission Association, in an address delivered at St. Louis, December 16, before the Western Association of Shoe Wholesalers and the St. Louis Manufacturers and Jobbers, made very clear the present status of the campaign for a permanent tariff commission. Mr. Cobb's association has been extremely active during the past two years in educating the public, and especially Congress, as to the vital necessity of a permanent commission to handle the important question of the tariff. The association is made up of more than 100 of the principal commercial bodies of the United States. Mr. Cobb in his address described the progress of the campaign, and stated that in his opinion there is no more vital question before the American public than that of a permanent tariff commission which undoubtedly will serve to take the tariff out of politics. He said in part:

"The present condition of our tariff laws comes from the fact that they have been rather a haphazard growth than a consistent creation. They are based on the constitutional provision permitting the levying of duties on imports for the purpose of providing national revenue. The idea of using this power for the purpose of protection was an afterthought of which there is no suggestion in the Constitution, but the Supreme Court has declared it to be constitutional, and it is undoubtedly legal for Congress to fix import duties for the purpose of protection in its discretion. The far-reaching possibilities of the exercise of this power have not been and are not to-day fully appreciated. It is a power which can be applied to enrich or ruin individuals, industries or communities so directly and so quickly that its application must of necessity be subject to every sort of interest and pressure that human ingenuity and avarice can devise. The safeguarding of the exercise of this power by Congress is fundamentally the object of our work.

"As matters stand to-day, I think it may be assumed that the country has declared in favor of a fair and reasonable protective tariff with no excessive duties and no special privileges, and with this, most of us are in hearty accord. I think I may also say that most of us are of the opinion that the Payne bill does not fully measure up to this standard and the country in general is of the same opinion.

"We claim that far better results, and we believe the best results can be obtained through a permanent, independent tariff commission in connection with provision for revision by schedule. This latter, I believe to be of great importance for two reasons. First, if one schedule is under consideration a large majority of the men sitting in judgment have no interest either personal or for their constituents, whereas in a general revision, practically every judge has an interest at stake. And second, a general revision upsets and disturbs the entire business of the country, and creates a general unrest, largely sentimental, but none the less real, whereas the discussion of one schedule affecting a comparatively small number would have no appreciable effect upon general business.

"The commission should be independent, not nonpartisan, but entirely independent of any question of partisanship, as much so as the Supreme Court. The members of the commission should also be independent of responsibility or obligation to any appointing power, which can only be accomplished in my opinion by making the tenure for life or for so long a term that the question of reappointment is to a majority of the members at all times a matter of remote interest.

"In taking up the powers of the commission I will say in general that it seems to me unwise to give it any authority beyond the duty to investigate and report. The right to fix or change rates of duty would be unwise even if constitutional. This power should remain in Congress, and it should be no part of the duty of the commission to consider or settle questions of national policy. It is for the country to decide whether the policy shall be high protection, low protection or tariff for revenue, and it is for Congress to carry out the mandate of the country. The commission should be simply an agency to provide information to assist Congress in acting intelligently and consistently. The work of the commission would be equally necessary in consistently carrying out either policy."

New York Central Rails for 1911

In connection with the statement that the rail requirements of the New York Central lines will be 150,000 tons for 1911, President W. C. Brown says that the total of orders given in 1910 was 165,000 tons and in 1909, 101,000 tons. The amount of rail wear on New York Central tracks in the past year, particularly side wear from wheel flanges, has led to a more exacting specification for 1911. President Brown says:

> Neither the regular Bessemer rail nor the Bessemer ferrotitanium rail has been found entirely satisfactory for our high speed tracks. Dr. P. H. Dudley, our consulting engineer, has prepared specifications which I have approved for the high class open hearth rail. Neither the Steel Corporation nor the Lackawanna Steel Company was prepared to quote a definite price on the kind of rail we wanted. Each of them is going to make an experimental rolling of 10,000 tons subject to the test that we require, after which they will be in a position to name the price at which they can furnish us such rails as we want. Our purchase of steel rails for all lines will approximate $4,500,000.

In addition to open hearth rails, it is understood that the New York Central will buy a certain tonnage of ferrotitanium Bessemer rails for next year. Heretofore the New York Central has furnished the ferrotitanium used in making these rails on its specifications and has required that the heat be held three minutes in the ladle after adding the ferrotitanium, before teeming the ingots. For this extra time the railroad agreed that 25 cents a ton might be added to the price of ordinary Bessemer rails.

The New York Central Lines have laid special stress on the avoidance of rail breakage. They have permitted 0.10 in phosphorus, but have been content with lower carbons than some other roads, specifying a range of 0.37 to 0.47 per cent. carbon for 70-lb. rails, 0.40 to 0.50 for 75-lb., 0.43 to 0.53 for 80-lb., 0.44 to 0.54 for 90-lb. and 0.45 to 0.55 for 100-lb.

The Jeffrey Mfg. Company, Columbus, Ohio, has opened a new branch office in the Fourth National Bank Building, Atlanta, Ga., with D. C. Rose, formerly with the Dodge Mfg. Company, as manager. A stock of Jeffrey chains and catalogues will be on hand. This is the 10th Jeffrey branch office in the United States, although there are over 100 Jeffrey agencies situated in the principal cities of this country, as well as in the leading commercial centers all over the world. The Jeffrey products consist of elevating and conveying machinery for handling and distributing material for every possible purpose, including the designing, supervision, manufacturing, assembling and erecting of such apparatus.

Cement Meetings in New York

The Association of American Portland Cement Manufacturers held its annual meeting at the Hotel Astor, New York, December 12 to 14. One of the most interesting features of the meeting was a paper by W. S. Mallory, president of the association, and also president of the Edison Portland Cement Company, who described the experience at the works of that company in the closing of its plant on Sunday. It had been an accepted practice in the industry that kilns could not be shut down over Sunday without causing considerable losses. Thomas A. Edison insisted that it could be done, and Mr. Mallory's paper explained the successful results in the adoption of the six-day week. Following is an extract from Mr. Mallory's paper:

> I have corresponded with many of the largest plants in other lines, who use kilns and furnaces of various types, and find that outside of blast furnaces, which produce pig iron, none of them, such as open hearth furnaces, puddling furnaces, cupolas, heating furnaces, brass furnaces, air furnaces, copper furnaces, operate on Sundays, although in some cases light heat is kept on the furnaces over Sunday.
>
> Kilns for the manufacture of brick and similar material are kept under heat on Sunday, but are seldom loaded and unloaded on that day. Therefore, if all these allied lines of manufacture can successfully operate their kilns and furnaces only six days per week, why is it necessary, in view of the results obtained at the Edison plant, to operate cement kilns for seven days each week? If an arrangement could be made by which every cement plant in the United States would discontinue Sunday operations, the problem of over capacity for 1911 would be solved, and more than 30,000 employees would have their rest on Sunday, and be in a position to do much more efficient work the other six days.

In the discussion which followed the statement was made that the system had been tried successfully by the Vulcanite Portland Cement Company. The association took no action on the recommendation for a general shutdown on Sunday, but the paper was taken under special consideration for discussion at a later date.

The new officers of the association are as follows: President, Edward M. Hagar, Universal Portland Cement Company; vice-president, W. S. Mallory, Edison Portland Cement Company; treasurer, John B. Lober, Vulcanite Portland Cement Company. Executive Committee: Ernest R. Ackerman, Lawrence Cement Company; Geo. S. Bartlett, Western Portland Cement Company; A. H. Craney, Jr., St. Louis Portland Cement Company; Bethune Duffield, Wabash Portland Cement Company; T. Henry Dumary, Helderberg Cement Company; R. W. Kelley, Virginia Portland Cement Company; R. W. Lesley, of American Portland Cement Company; Conrad Miller, Dexter Portland Cement Company; John R. Morron, Atlas Portland Cement Company; S. B. Newberry, Sandusky Portland Cement Company; Geo. E. Nicholson, United Kansas Portland Cement Company, and C. H. Zehnder, Alma Cement Company.

The National Association of Cement Users held its annual convention in the Concert Hall of Madison Square Garden, New York, December 12 to 14. Numerous delegates were present from foreign concrete associations and from various Government departments and municipalities. The following officers were elected for the coming year: President, Richard L. Humphrey, Philadelphia; first vice-president, E. D. Boyer, Catasauqua, Pa.; second vice-president, Prof. A. N. Talbot, Urbana, Ill.; third vice-president, E. S. Larned, Boston; fourth vice-president, Prof. Ira H. Woolson, New York.

The first annual cement show in New York was opened in Madison Square Garden on the night of December 14 and closed December 20. There have been few shows in that noted exhibition hall which have equaled it for generally attractive appearance and educational value. Many of the booths contained novel effects for interesting and instructing the visitors. The show was particularly instructive to those who contemplate putting up buildings either for residential or business purposes. It included numerous exhibits of machinery and equipment for contractors, in which most of the representative manufacturers of the country participated.

The Crane Company's New Malleable Foundry

The Crane Company, Chicago, announces the completion of its new malleable foundry, which is located at South Canal and Fifteenth streets. The building, which has five stories, has a frontage on Canal street of 177 ft. and on Fifteenth street of 225 ft. It is built of reinforced concrete and steel, being fireproof throughout. Following the practice which it has pursued for many years, the company has placed the foundry on the top floor. This floor also contains the galvanizing department. The fourth floor is used for the cleaning, sorting and annealing of castings. The core making and some of the machine work is done on the third, while the second floor is given over to the general machines and cutting of fittings. On the first floor are found the stockroom, and the shipping and receiving departments. The basement is used for the storage of sand, coal, iron and other materials.

The general system of foundry work used in the new plant is that of continuous pouring. In this system the work to which the molder confines his operations is that of making the molds and placing them on a conveyor which carries them to the men who do the pouring. After pouring, the molds are carried to other workmen, who dump them out and start the sand and castings to their respective conveyors and departments. Each department is provided with the most modern foundry equipment, all of which is operated by electricity, no steam power being used.

Welfare of the employees has been one of the considerations in the erection and equipment of the new plant, and pains have been taken throughout the building to make it free from dust, smoke and other unwholesome features. Dressing rooms as well as a special dining room are provided for the girls employed in the core making department, and shower baths for the men. The plant is described at length in the *Valve World* of November, and is the first to be erected by the company since its decision some time ago to house the manufacturing end of its business in fireproof structures. Nearly all the equipment of the building was designed and built by the company.

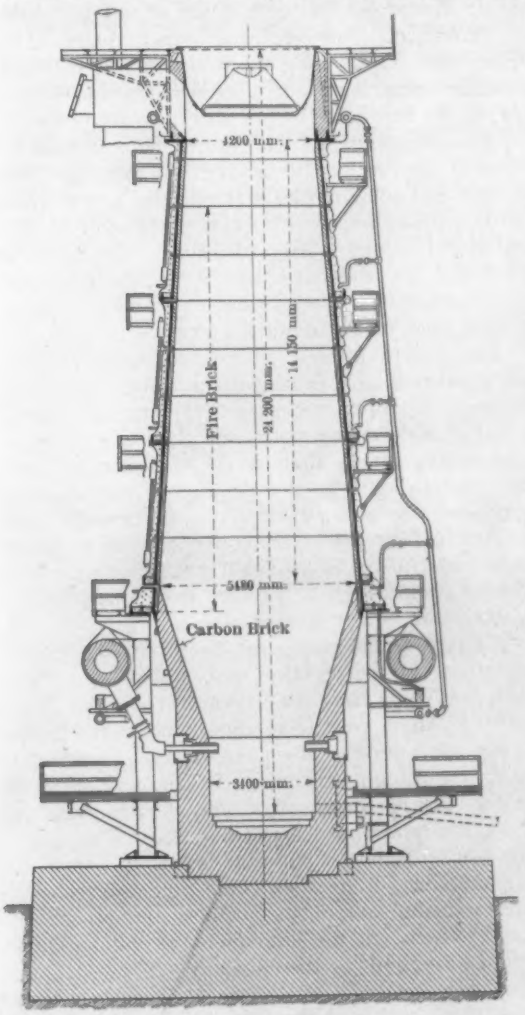
Progress of the Heroult Furnace in Germany

The Duesseldorf correspondent of *The Iron Age* writes: "The Lindenberg Company of Remscheid, which holds the German patents for the Héroult electrical furnace, says in its annual report, just issued, that the use of this furnace is making steady progress in Germany, and that the prospects for the next year are favorable. It refers to 23 furnaces of this type already in operation and 17 in course of construction, of which three will be of 20 tons capacity. The 23 furnaces in operation produce 225,000 tons of steel a year. The company says it has worked out new metallurgical processes of far-reaching importance, and has applied for patents on them in all important countries."

The Corrugated Bar Company, Buffalo, N. Y., has changed its principal place of business and office from New York City to its works at Blasdell (South Buffalo), adjacent to the plant of the Lackawanna Steel Company. The Corrugated Bar Company is the Buffalo branch of Garrison & Co., St. Louis, manufacturers of reinforcing bars for concrete work. D. E. Garrison, St. Louis, is president of both companies.

The Burgers Thin Wall Blast Furnace

What has been done in the United States in the direction of thin walled blast furnaces with water cooled shells was indicated in an article in *The Iron Age* of June 16, 1910, page 1458. The illustration given in that connection was of the No. 8 furnace at the South Chicago works of the Illinois Steel Company. Similar furnaces have been provided by United States Steel Corporation in the Pittsburgh, Cleveland and Birmingham districts. The resemblance of the design of these furnaces to that developed 12 years ago by Burgers at the Gelsenkirchen Works in Germany is referred to by the London *Iron and Coal Trades Review* in an article on the Burgers type from which we take the following:



Sectional Elevation of German Blast Furnace Constructed on the Burgers System.

In the forced working of blast furnaces the brick lined shaft presents the weak part, and in the wear the section of the furnace shaft undergoes alterations which cause increased coke consumption and heavy repairs. The Burgers design was directed toward preserving the shaft for a longer period by decreasing the lining, and, on the other hand, by making the furnace shaft wall in iron and as strong as possible. In the furnace so designed a supporting ring rests on columns. For the sake of safety there are, round the ring, two iron hoops. The inner wall of the ring, as may be seen from the illustration, is cooled by water which collects at the lower part of the ring and can be drawn off wherever suitable. The surface and interior of the furnace is lined with thin firebricks, 2 to 2½ in. in thickness. On the supporting ring rest shaft rings about 5 ft. deep, which consist of separate segments. The latter are held together by strong bolts, and are furthermore secured by hoops. At the bottom flange of each third segment is arranged a channel; the various channels are connected by pipes to draw off the water at a few places only. At each third shaft ring is a water pipe which supplies the cooling water at a low pressure. The horizontal joints of the shaft have groove joints to avoid a shifting of the shaft ring. The interior lining of the segments consists of firebricks. The bottom is arranged as usual with plates and provided in the interior, as well as the hearth, with carbon bricks.

The first furnace of this type was blown in in June, 1899, at the Vulcan Works at Duisburg, and has been in blast for eight and one-half years. This furnace was 61 ft. 6 in. high, with a bosh diameter of 19 ft. In consequence of bad trade it was blown out and was then increased in hight up to 65 ft. 6 in. In the reconstruction the iron shaft was used again. The new design differs from the original in so far that each set of three rings has one water channel, whereby the water cooling is simplified.

There are five furnaces on the American system at different works, partly already in blast and partly under construction. Contrary to Burgers, who made the shaft principally of cast iron plates, the Americans have arranged the casings of wrought iron or cast steel, an alteration the value of which is doubtful, according to experience in Germany, as after an intensive wear and deterioration of the firebrick lining, excessive cooling takes place. A further consequence will be that the whole furnace stack, in consequence of the change in temperature, will move, warp and get slack in the joints.

There are to-day five furnaces in blast in Germany built on the Burgers system. Last year the Société Générale des Hauts Fourneaux, Forges et Aciéries de Makievka, of Makievka, in Russia, built a furnace on the same system. This company expressed satisfaction with the construction and regular working of the furnace. The coke consumption was lower than that of the best periods of previous furnaces with brick shafts. With regard to the capacity, they report that on account of cholera, labor difficulties had taken place, but in spite of these they had had on various occasions daily outputs of 280 tons of hematite pig iron. Under ordinary circumstances they expected to reach easily 300 tons per day. This company intends to rebuild a second furnace and to provide it with a cast iron casing, as shown in Fig. 1.

With regard to German, it can be reported that at the Gewerkschaft Deutscher Kaiser in Bruckhausen a furnace 85 ft. high and 23 ft. bosh diameter, which had given on a monthly average about 500 tons per day, has been continuously working over a period of years. In Dortmund a cast iron cased furnace produces about 350 tons per day, while at Gelsenkirchen several furnaces of 69 ft. hight and 21-ft. bosh diameter have given a daily output of 200 to 300 tons per day. Here the working of the furnaces has not caused any difficulties and is very regular.

Texas, the largest State in the Union in point of area, made greater progress in its increase in population during the last 10 years than any of the States which exceed it in the number of inhabitants, and now takes rank as fifth State in population, passing Missouri, which in 1900 held that place. Census statistics just issued show that the inhabitants of Texas now number 3,896,542, and that only New York, Pennsylvania, Illinois and Ohio surpass that State in population, while Missouri drops back to seventh place, having been passed by Massachusetts during the last 10 years. The population of Texas increased 847,832, or 27.8 per cent. in the past decade.

The Whiton Hardware Company, Seattle, Wash., has purchased the entire stock of tools, shop supplies, valves, fittings and general foundry and mill supplies of the Vulcan Iron Works of that city.

The Gyroscope and Its Useful Possibilities—IV

The Author's Development of the Active Type

BY ELMER A. SPERRY, NEW YORK.

In Fig. 32 is a pendulum with a small gyroscope mounted upon it. This pendulum has freedom of oscillation upon its two gudgeons. As stated, all ships roll like a pendulum, and therefore, this may be considered to be a ship with a small gyroscope upon it. The spinner weighs about a pound, and it spins at a very low velocity compared with what a well organized gyroscope would do.

If the rings supporting the gyroscope are locked so that it cannot precess and the pendulum is set swinging it will be found to take as long to come to rest as when the gyroscope is not spinning. When the rings are released so that the gyroscope can precess automatically, the pendulum will come to rest in much shorter time, but it will be noticed that the dampening effect is greatest while the swing is large, and that finally when the oscillations are short the gyroscope appears to have no more effect. This is the passive use of the gyroscope.

The Active Gyroscope

In Fig. 33 a cord is seen passing through the two gudgeons of the pendulum just above the tripods and at a point midway between these gudgeons the cord passes around one of the little horizontal pulleys immediately below the gyroscope arranged in an elongated opening in the wooden top of the pendulum. These pulleys operate the little pinions in the lower

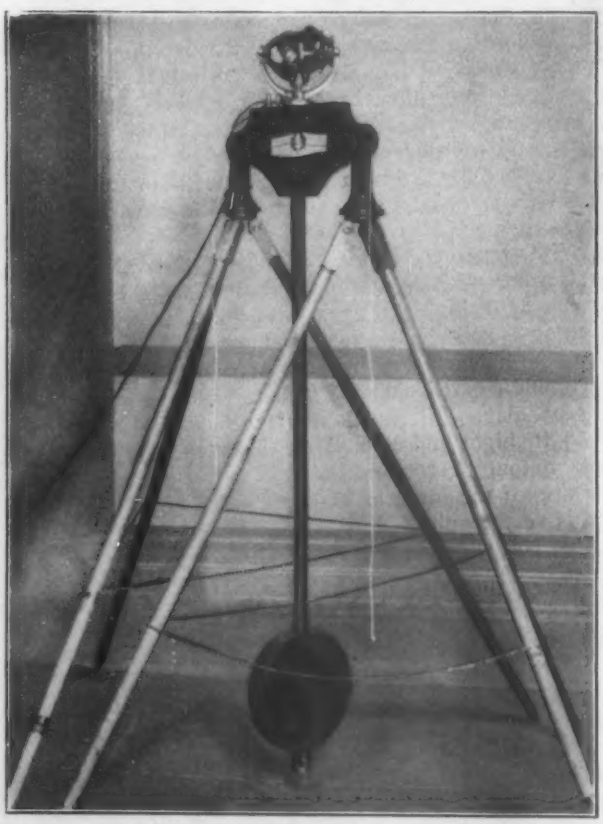


Fig. 32.—A Pendulum with a Gyroscope for Dampening Its Oscillations.

middle portion of the fork of the gyroscope, one being geared directly to the base ring shown horizontally in Fig. 33, and the other operating the precessional ring through an intermediate miter segment. This arrangement affords means whereby either of these rings may be tilted at will by the simple act of drawing the cord through the center of the gudgeons and around either one or the other of the pulleys, to accelerate precession. No movement, manipulation or stress whatsoever applied through the cord, could of itself effect the oscillation of the pendulum for the reason just stated that the cord passes through the center or axis of this oscillation and in line therewith.

Since the gyroscope responds only to the large or wide angle oscillations, but either does not respond at all or moves very slightly with the smaller oscillations, it cannot, when used passively, control or extinguish these smaller oscillations. It being desired, especially in connection with improvements in conditions for gunnery on battleships and war vessels generally that the gunner should operate if possible from a level gun platform, it becomes desirable to act on these smaller

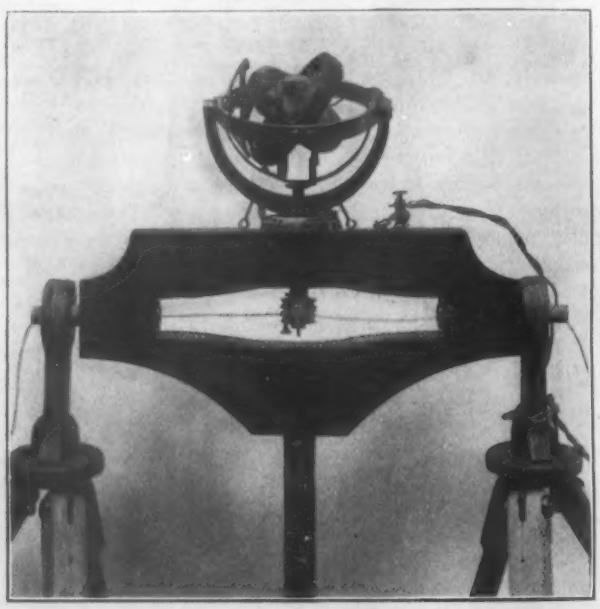


Fig. 33.—Detail of the Gyroscope and Pendulum Trunnions.

oscillations or roll of the ship so as to completely extinguish them and hold the ship on a practically even beam. This is especially true now, as all the larger vessels are designed for broadside service and volley fire. The gunner does not know at what instant his gun is to be fired, and therefore is compelled to keep an incessant aim upon the target. If the body is rolling much or little this is a difficult task. The recoil of the volley fire also throws the boat over and sets up rolling, and it is the duty of the gyroscope to extinguish and prevent all rolling disturbances from whatever source. The lesser angle rolling must be taken care of by the active type of gyroscope. By this means the full angle operation of the gyroscope is secured independently of the amount of motion or, in fact, any motion whatever on the part of the ship and is therefore in readiness to deliver to the boat stresses which are equal and opposite to those received by the boat from any source and prevent them from causing the boat to roll.

This was undertaken by Sir John I. Thornycroft in his work for preventing rolling, but his devices involved changing the center of gravity of the vessel and thus introduced an additional disturbing and unstabling element which required additional treatment. As will be remembered, his device involved a great moving weight running as high as 5 per cent. of the

total displacement of the boat and a very large amount of hydraulic machinery for handling these weights and a considerable amount of motive power for operating them. With the active type of gyroscope, a weight of only a small part of 1 per cent. of the displacement of the ship is required to perform a very substantial service, down to the point of practically fully extinguishing the rolling. By the use of this device, there is entire absence of any shift of the center of gravity of the vessel, and its stability remains unchanged. The sizes, weights, speeds and location of a gyroscope for this purpose are among the points which have been canvassed in tests carried on at the Washington Navy Yard during the past winter.

Tests of a Ship-Steadying Gyroscope

Figs. 34 and 35 show front and rear views respectively of a working model of a 26,000-ton battleship of the super-dreadnought class, with 5-ft. metacentric hight and 18-sec. period of roll, capable of rolling through a total arc of 60 deg., and means of autographically recording all motions, both of the ship's model and the gyroscope upon it. The gyroscope was operated both passively and actively; means were also provided for emplacing the discharges of the active gyroscope variously with regard to the ship's oscillation, so that the effect of different combinations might be studied. Many other auxiliaries were provided, one of which permitted the actual velocities of the gyro wheel to be taken while in operation. This was accomplished by the stroboscopic apparatus of Capt. D. W. Taylor, similar to that used by him in his classic investigations of propellers under service conditions; in fact, both the ingenuity and reliability of performance of the model ship and the auxiliaries is directly due to Mr. Taylor and his assistants at the Washington Navy Yard. By means of this very complete equipment, studies and records have been made and charts of performance prepared and valuable data accumulated, much of which is new, as many of the observations, it is believed, were never before undertaken.

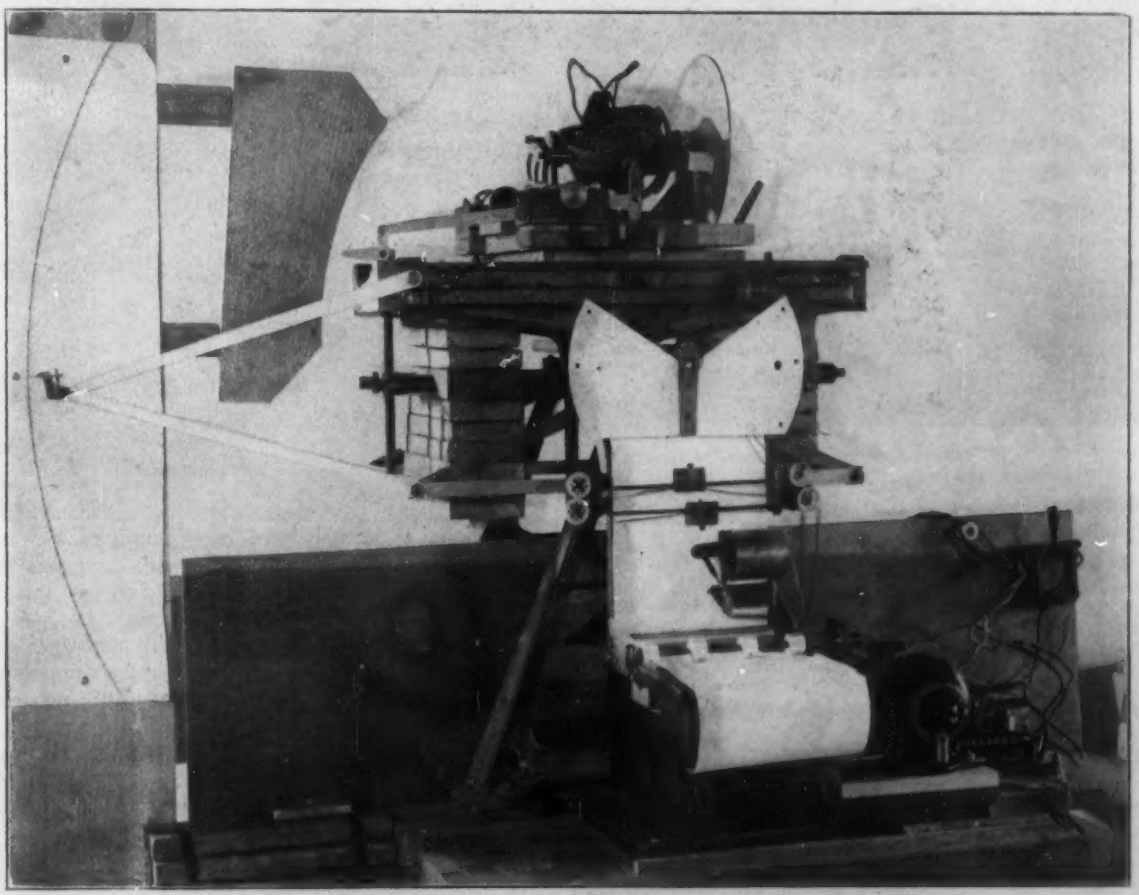


Fig. 34.—Apparatus Used in Government Tests of the Sperry Gyroscope as a Ship Stabilizer.

The investigations with the active type of gyroscope are in a new line of research; the results obtained are important in point of much more perfect control of the ship's roll than hitherto possible.

Captain Taylor has prepared a very full report upon this work, forming a part of which is a 40-page appendix in which he treats the question in a most masterly manner under some 16 heads. In this most unique and valuable work, he has given an original mathematical treatise on practically all the phases and bearings of this question, including an original investigation of the underlying phenomena of the gyroscope itself. It is of the greatest value to this important art that its problems should have come under the observation and been studied and reviewed by so able a mathematician and at the same time one so experienced in all branches of experimental research, and well fitted by long training to judge of the practical bearings of the results extending, as does this experience, to the very largest undertakings and structures in the marine. To give some idea of the enormous work involved, the author takes the liberty of reproducing, Fig. 36, a sample page of this treatise.

The practical effect in operation of the active type of gyroscope is to secure a large reduction of weight over and above that possible with the passive type. One of the reasons for this becomes apparent from the action of the pendulum before described. With the smaller angles of roll, the gyroscope would have to be large enough so that its small angles of response would develop the required energy for extinguishing or still further reducing the roll (complete extinguishment being impossible); whereas with the active type the full 180-degree oscillation of the gyroscope is always available, where required for the extinguishment of large or even the smallest angles of roll as necessary. Thus an extremely small machine taking advantage of the larger angles (between 20 and 30 times as large) is sufficient to accomplish this purpose.

Fig. 37 shows three curves, of which the one at the top gives the number of oscillations of the ship's model

before it was brought to rest by the natural friction, after having been originally tilted to 25 degrees to one side of the center. The shorter central curve illustrates the number of oscillations of the model with the gyroscope acting passively or on Dr. Schlick's plan,

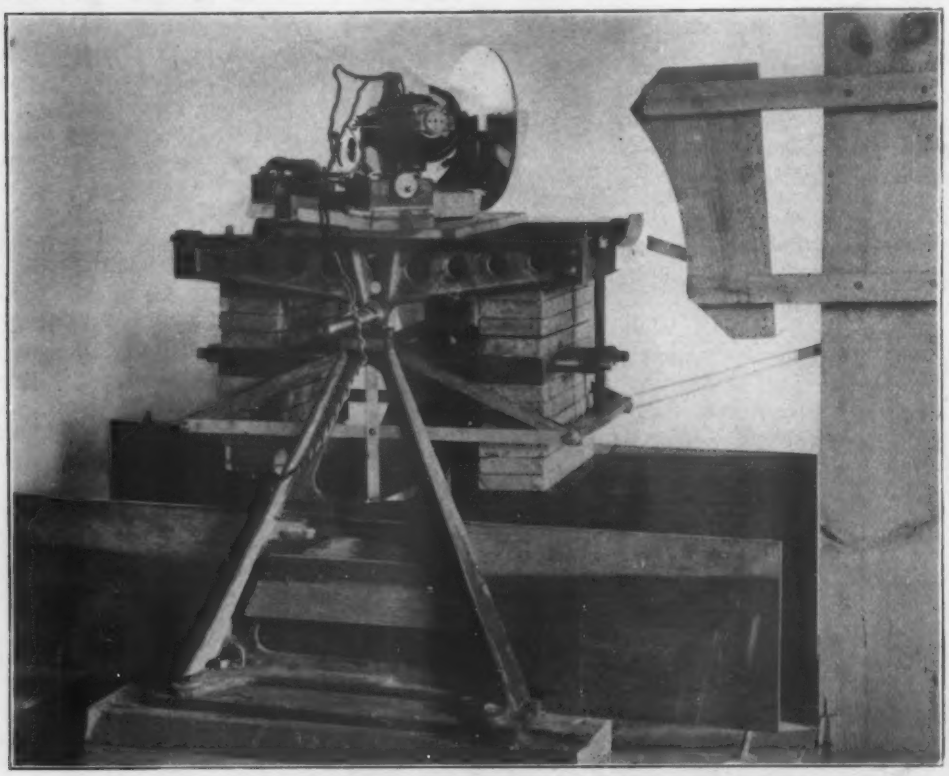


Fig. 35.—Rear View of the Testing Apparatus for the Sperry Ship Gyroscope.

the several rolls of smaller magnitude at the end being omitted where the passive type of gyroscope failed to respond, and the still shorter curve at the bottom shows the number of oscillations of the ship in being

$$\frac{M'_z}{m r^2} = (\alpha^2-\beta^2)\sin\psi\cos\psi\cos\phi - 2\alpha\beta\sin^2\psi\sin\phi + \gamma\sin^2\psi\cos\phi + \delta\sin\psi\cos\psi\sin\phi - \alpha^2\sin\psi\cos\psi\cos\phi + \gamma\cos^2\psi\cos\phi.$$

$$= \beta^2\sin\psi\cos\psi\cos\phi - 2\alpha\beta\sin^2\psi\sin\phi + \gamma\cos\phi + \delta\sin\psi\cos\psi\sin\phi$$

Now as before put $n = \frac{w}{2\pi g}d\psi$

Then

$$M'_x = \frac{wr^2}{2\pi g}\left[\beta^2\sin\phi\sin\psi\cos\psi d\psi + 2\alpha\beta\cos\phi\sin\psi d\psi + \gamma\sin\phi\sin\psi\cos\psi d\psi - \delta\cos\phi\right]$$

$$M'_y = \frac{wr^2}{2\pi g}\left[-2\alpha\beta\sin\psi\cos\psi d\psi + \delta\cos^2\psi d\psi\right]$$

$$M'_z = \frac{wr^2}{2\pi g}\left[\beta^2\cos\phi\sin\psi\cos\psi d\psi - 2\alpha\beta\sin\phi\sin^2\psi d\psi + \gamma\cos\phi\sin\psi\cos\psi d\psi + \delta\sin^2\psi d\psi\right]$$

Evidently the moments for a complete ring of radius r and weight w will be obtained by integrating the above expressions with respect to ψ from 0 to 2π.

Now

$$\int_0^{2\pi}\sin\psi\cos\psi d\psi = 0 \qquad \int_0^{2\pi}\sin^2\psi d\psi = \pi = \int_0^{2\pi}\cos^2\psi d\psi$$

Let M_x M_y M_z denote the moments for the complete ring. Then evidently

$$M_x = \frac{wr^2}{2\pi g}\left[2\pi\alpha\beta\cos\phi + 2\pi\gamma\sin\phi\right] = \frac{w}{g}r^2\left\{\alpha\beta\cos\phi + \gamma\sin\phi\right\}$$

Fig. 36.—A Page from Capt. D. W. Taylor's Report on the Gyroscope Tests.

brought to rest (absolute freedom from motion being possible) by the same gyroscope when operated actively. These are among the interesting results reached in the investigations referred to above.

Possible Influence on Ship Design

When the motive power of vessels changed from an upsetting force to one almost exclusively of forward thrust, the design of ships underwent quite radical changes in connetion with lines affecting the stability, decreasing this factor and favoring decreased resistance, aiding the attainment of higher speeds. Now that stability may be imparted to a structure of naturally small righting movement, and, as is well known, even to structures of unstable equilibrium, it is possible that even more radical changes in design may result. Ships may now be designed that are practically free from those ballistic qualities which favor rolling, but structures to which unequal sea pressures easily impart motion need no longer be avoided, as a comparatively small gyroscope which can easily be present in duplicate may very readily hold them practically from rolling motions in such a way that ordinary seas will have little or no effect upon them, while an exceptional wave will have only a temporary effect. It has been suggested in connection with such vessels that they need not pitch if of sufficient length; be this latter fact as it may, it is apparent that a point has now been reached and a situation created with reference to the resisting and prevention of rolling and motion of ships at sea that, to say the least, is interesting in many quarters; for example, to those who are concerned in pro-

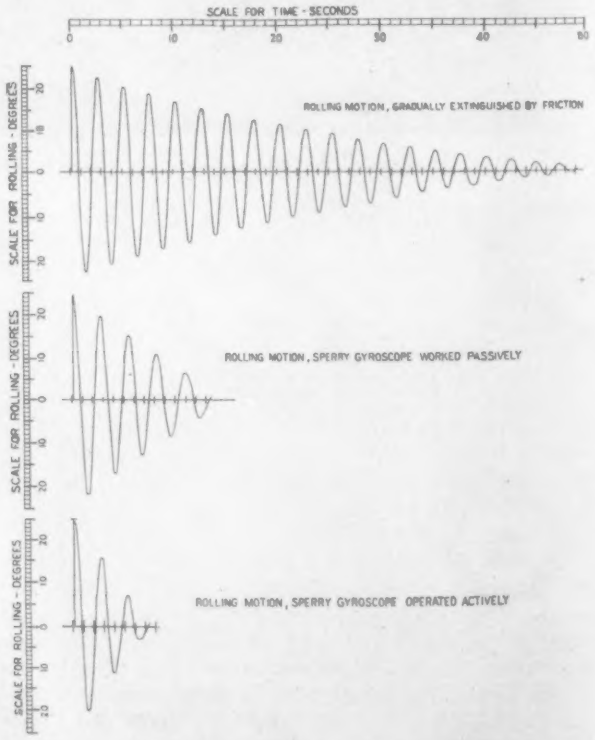


Fig. 37.—Curves Comparing the Dampening Effect Without the Gyroscope and with It Working Both Passively and Actively.

viding safety and comfort to passengers at sea, and in preventing deterioration of certain classes of freight, such as live stock, which is known to suffer heavy depreciation in stormy weather. This is entirely outside naval uses, especially as related to gunnery, trimming ships to secure level gun platform, suppression of recoil from broadside firing, and other uses.

The New Field Open to the Gyroscope

In following out the possibilities of the active type of gyroscope, the author has constructed an apparatus adapted to deliver gyroscopic control in a single direction by carrying the gyroscope through a succession of motions for reversing the plane between each impulse. Two views of this apparatus are illustrated in Fig. 38.

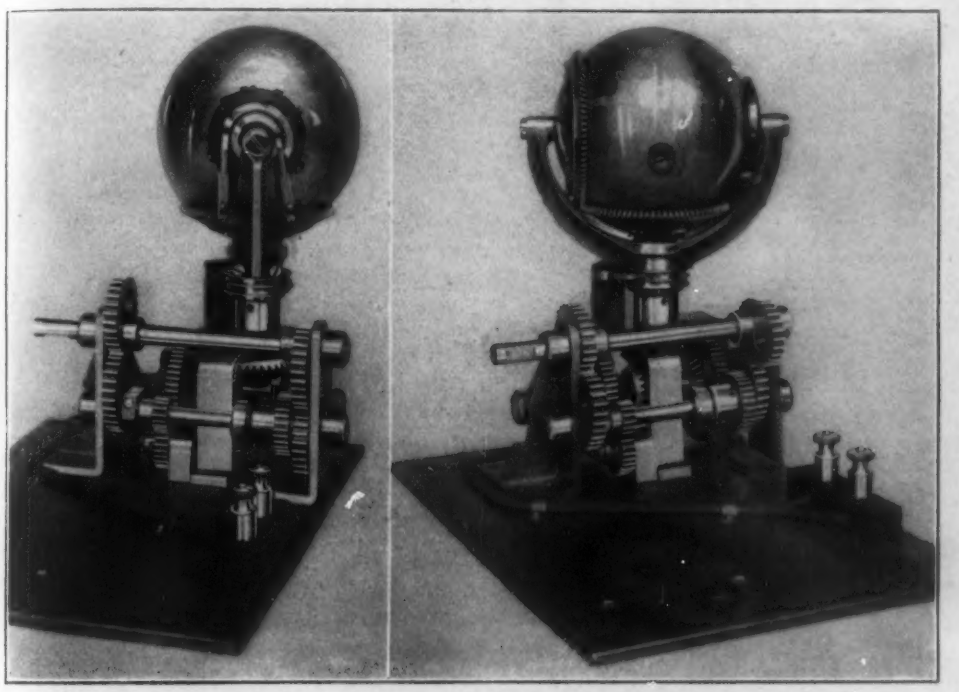


Fig. 38.—Two Views of a Special Model of the Sperry Active Gyroscope.

It is evident that the early workers were hampered by too close adherence to the earlier treatment of statical stability, and the direct effect of wave slope together with some other elementary factors, rather than the more practical considerations of the effect of movements of the ship, stresses involved, &c. In 1904, Dr. Schlick presented a paper before the Institution of Naval Architects. Accompanying this paper in the form of an appendix is a mathematical treatise of the theory of the gyroscope and its application to steadying ships. There seems, however, to be little in this treatise which is useful in the practical application of the gyroscope, especially the active type of gyroscope to ships. Captain Taylor in his report on this subject stated of this treatise that it is a very elaborate mathematical theory, but that it largely ignores practical considerations.

The problem is a comparatively simple one—namely, of holding the ship against rolling by neutralizing with the gyroscope each disturbing influence as it reaches the ship, while taking advantage of all the aid possible through the design of the hull and disposition of the masses. With this end in view it is not yet known the best relation between these two features. With the last adjusted to best fit the new conditions, it is believed that the gyro steadying plant of the active type will be well within practical limits of space, weight and cost. Especially is this true when compared with the practical results of its operation. A great many ships, as they now stand, could with comfort and profit utilize the gyro steadying gear of this class, which is at present available, and some important installations are now being contemplated. In this connection it is interesting to note that the weight of an active gyroscope for each degree of roll quenching power on a modern battleship would be about one-tenth that of a zone of equal width of the submerged armor thus possible of displacement, and the cost much less; this is outside of the very important consideration of having the entire ship under control either automatically to extinguish roll or at the will of the commander, with its many evident advantages.

The Gyroscopic Compass

Referring to the use of the gyroscope as a compass, it is interesting to note that the possibility was first brought out by Foucault, 1852, who, after many attempts, succeeded finally in making up an apparatus so delicate and beautifully constructed as to demonstrate the working of the instrument in the short period of duration of spins of a small disk. The observations were taken through a telescope. The directive feature was only a fraction off that of the magnetic needle, but magnetism or the location or variations in the positions of the magnetic meridian have nothing whatever to do with its directive feature, for it points to exact geographical north, not to magnetic north. About this time, Foucault took this apparatus to England and there aroused great enthusiasm in scientific circles by exhibiting it to the Royal Society in operation.

Hopkins in America, associated with the *Scientific American*, in 1878, made a small electrically driven

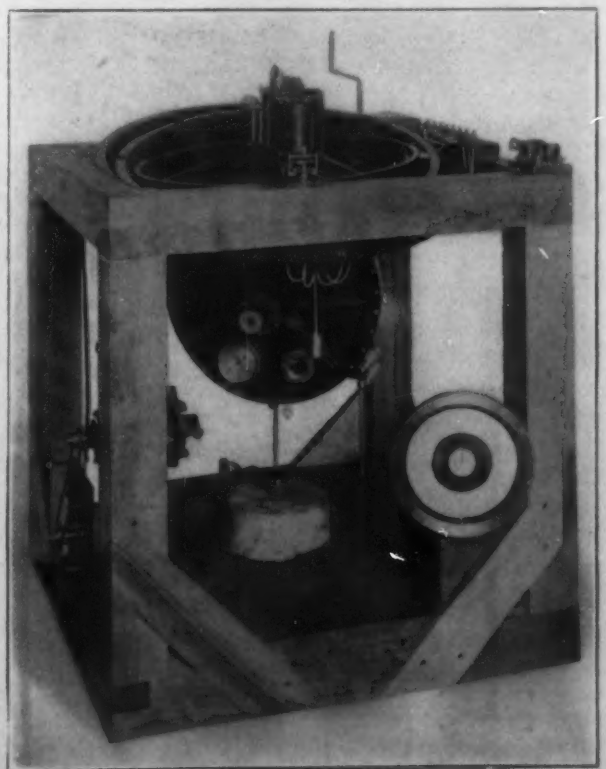


Fig. 39.—A Sperry Gyroscopic Compass in an Artificial Ship Mounting.

gyroscope by means of which better and more persistent results were obtained.

More recently, attempts have been made by a German firm to use mercury floats for sustaining the rotating wheel, constituting a gyrostat which, in this instance, runs at the enormous speed of between 22,000 and 23,000 rev. per min., which has been considered by many to be impractical. Those familiar with the use of mercury in its mechanical and also electrical applications usually find it very unsatisfactory. At best it is a volatile liquid, subject to many changes with differences in temperature, and what is worse, is also subject to the phenomenon known as "sickening," which affects the surface and the mercury for some distance under the surface, altering its mechanical behavior and also its viscosity. The best engineering practice has for some years avoided the use of mercury in every possible way, and especially where electrical conditions were involved, and substituting in its stead simple mechanical means which are free from these serious objections.

Working in this line the author has found simple details by means of which the whole gyroscopic proposition is reduced to a strictly mechanical basis easily within the comprehension of all, containing no unknown quantities and correspondingly easily dealt with. In the cases where the gyroscope is used and employed as a battle compass, the apparatus is placed below decks, and small instruments about the size of an ordinary compass are distributed in different positions on the ship, giving the exact indications of the gyroscopic compass itself.

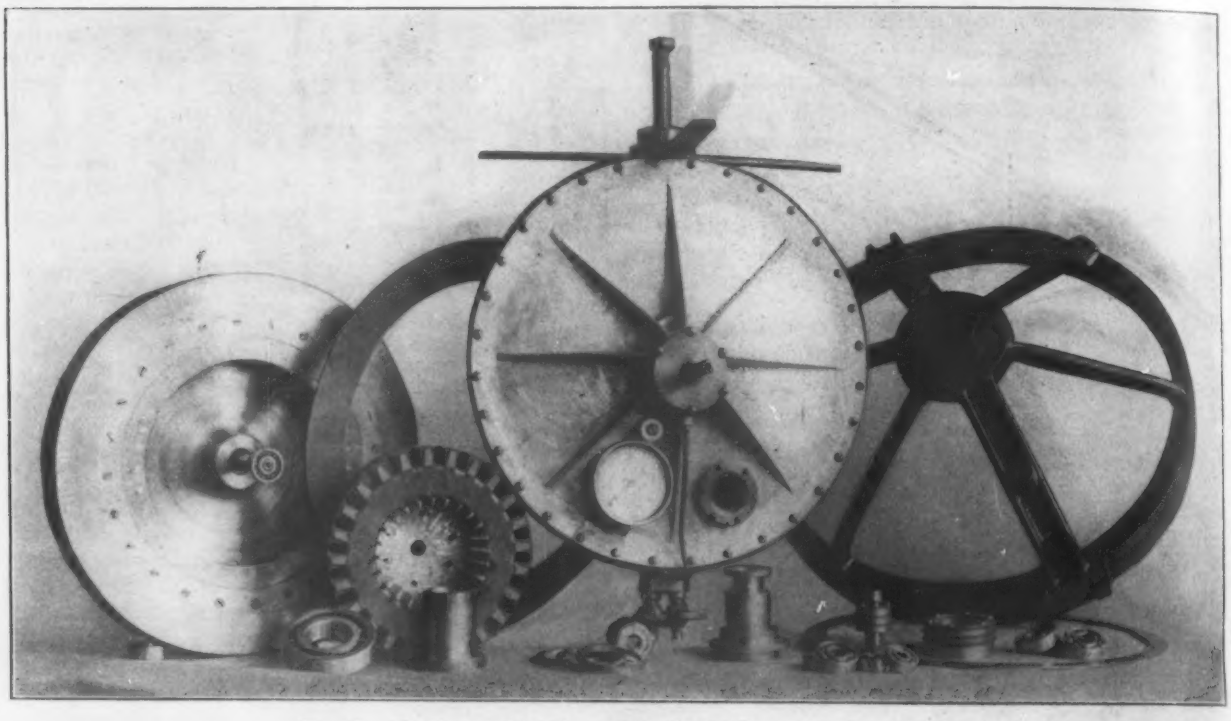


Fig. 40.—The Unassembled Parts of the Sperry Gyroscopic Compass.

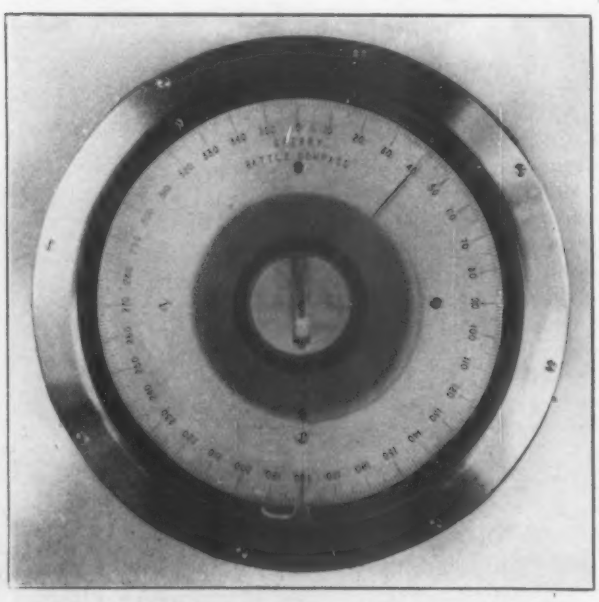


Fig. 41.—An Indicating Compass Controlled from Any Distance by the Master Gyroscopic Compass.

The author's work has extended to the point where action of such instruments can be controlled from the gyroscopic compass and distributed as desired, the indications being accurate to a very small fraction of a single degree. Many observations have been made indicating that they are accurate to 1-3600 of the circle. Fig. 39 shows the battle compass as mounted in an artificial ship, which gives all changes of heading as well as automatic continuous roll and pitch to which the compass is continually subjected. Both roll and pitch may be varied at will as to angle and period. Fig 40 shows the unassembled parts of the compass.

Fig. 41 shows one of the receiving instruments for the binnacle or other position. It is found that this receiving instrument requires no cardian mounting and is equally accurate in any position, vertical or horizontal. Indications are held with the accuracy described following the master instrument instantly, and are very much more "dead beat" than an air compass for marine purposes, though it is not submerged nor is any liquid used in connection with it. Among the nu-

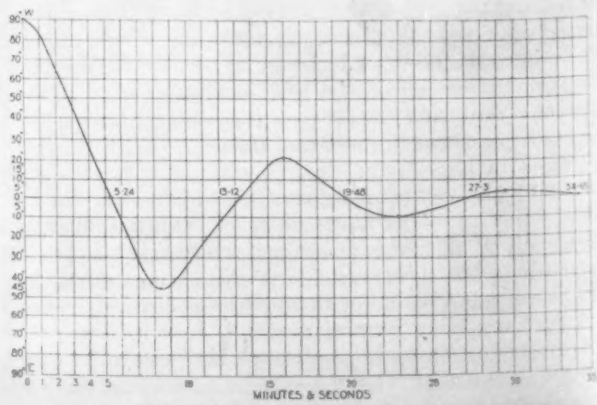


Fig. 42.—Diagram of the Settling Taken from the Sperry Gyroscopic Compass.

merous points never before achieved is the automatic correction of the northerly or southerly component of vessels' speed at sea, this correction being made between the gyroscopic compass and its transmitting member, in such a manner that the indications received by the navigator and elsewhere about the ship are thus absolute and maintain true geographical north.

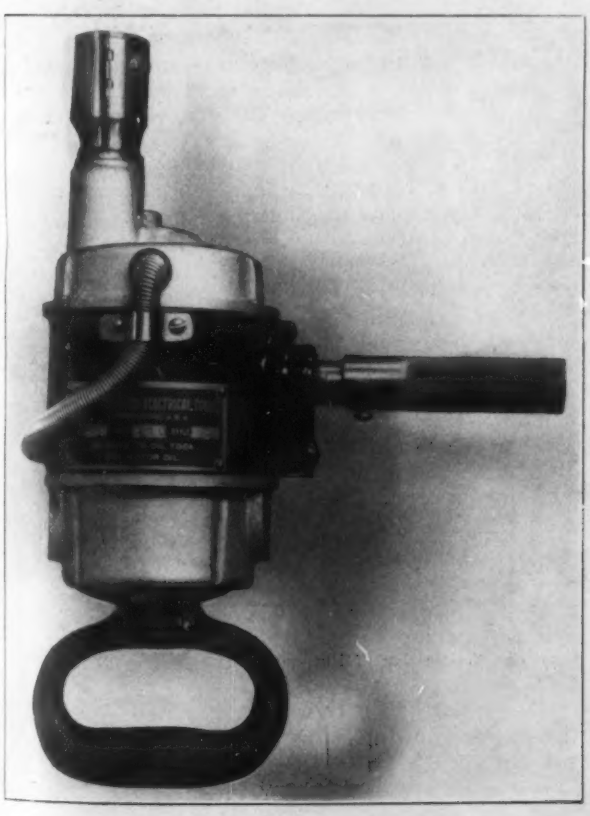
Fig. 42 indicates an actual settling taken from the author's gyroscopic compass, while in the operation of being started in the East and West position and brought up to about 4000 rev. per min. only. This shows the instrument to reach true north in 34 min.; at normal speed the directive force is about 6600 times that of the compass needle.

It is felt that the navigator has now at hand a most desirable aid, and one that greatly simplifies his work, for this type of compass is not affected in the slightest degree by the steel of the ship or cargo, nor any magnetic disturbances in either; neither should shifting cargo, turning turrets, gunfire, nor the striking of the ship by a shot disturb its accuracy or reliability, nor is it affected in the slightest by those disturbances technically known as deviation or variation.

THE END.

A New United States Electric Hand Drill

The United States Electrical Tool Company, 1938 West Eighth street, Cincinnati, Ohio, has placed on the market a new type of electric hand drill. This tool is claimed to be the lightest ever built and its complete weight is only 9 lb. The motor is of the self-starting induction type and is wound for 110 or 220 volt, 60-



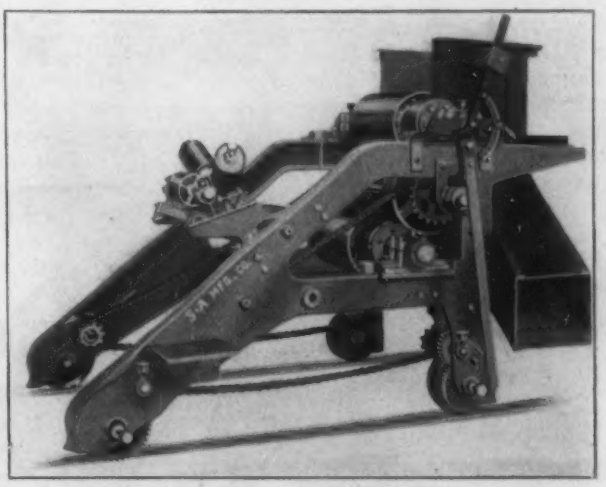
A New Electric Drill Made by the United States Electrical Tool Company, Cincinnati, Ohio.

cycle, single phase alternating current. The power for operating the tool is obtained from an ordinary lamp socket in the usual way. To reduce the weight of the drill to the lightest possible figure the casing of the motor is constructed of aluminum throughout.

The Central Iron & Steel Company, Harrisburg, Pa., has taken the contract for the plates for four of the torpedo boats to be built for the United States Navy.

The S-A Automatic Reversing Tripper

The Stephens-Adamson Mfg. Company, Aurora, Ill., has recently developed a new type of reversing conveyor tripper upon which an application for a patent is pending. The tripper is used to enable a belt conveyor



The New Conveyor Tripping Device Made by the Stephens-Adamson Mfg. Company, Aurora, Ill.

to discharge its load at any point along the line that is necessary when it is desired to discharge material into any one of several bins from a single conveyor or distribute the material along a large pile. The advantage of an automatic reverse on a tripper is that the tripper may be left unattended to work back and forth between the trips. In this way the material is piled evenly with no chance of clogging until the whole pile is level with the conveyor structure. The special feature of this tripper is its simplicity of design and the consequent reliability of operation. It is said to be a decided improvement over the old methods requiring cable pulls or complicated and expensive systems of gearing. As the drive is through friction gears, it is not positive and is therefore able to make allowance for obstructions on the track or accidents in which it is claimed a positive drive would be at disadvantage.

In the older type of automatic tripper made by this company, an iron friction wheel working on a shaft between the two tripper pulleys operated it. This friction engaged a paper friction on either pulley shaft depending upon the desired direction of travel, and the friction wheel shaft was mounted in an eccentric bushing operated by a hand lever to make the friction engage its mate on the desired pulley shaft. Motion was transmitted from this shaft to the tripper through all four wheels by gears and chains and sprockets.

In the new machine the hand lever controlling the movement of the friction wheel shaft is replaced by a longer wheel lever, which is hung vertically from the friction shaft so as to engage with the floor trips. In running against either trip, the lever which is shown hanging down at the right of the engraving operates the friction shaft through the eccentric bushing and reverses the direction of travel. The adjustable weight in the upper right corner assists the motion of the lever and also helps to keep the frictions in contact. If desired to keep the tripper stationary at any one point this weight may be locked in a neutral position.

F. H. Evans has moved into his new factory at 31 to 35 Hewes street, Brooklyn, N. Y., after doing a manufacturing business at 596 Kent avenue for 39 years. With largely increased facilities, with additional new and improved machinery, he will continue the manufacture of his specialty, the Evans patent expansion bolts; also his full line of tar and pitch heaters, roofers' and pavers' kettles, steel pails, &c.

The Paragon Electric Furnace*

A Combination of an Arc and a Resistance Furnace—Smaller Electrodes Possible

BY J. HARDEN.†

The electric steel furnace appears to be steadily gaining ground in this country, and among others a 1½-ton Kjellin induction furnace has recently been erected in Sheffield, for crucible steel work, and has successfully competed its guarantee run. This furnace is especially adapted for producing the highest grade of tool steel. It is, however, well known that a furnace of this type is not adaptable for any extensive refining of steel, owing to the refining surface of the bath being small.

It has long been recognized by steel makers generally that, although the induction furnace is an excellent tool in the hands of the crucible steel maker, a furnace which would permit more extensive refining, and also the construction of large units, at the same time keeping the advantages embodied in the induction furnace system, is much to be desired. It is because of the comparatively low power factor of larger furnaces of the plain induction type that this class of furnace has not been constructed in large units to any great extent.

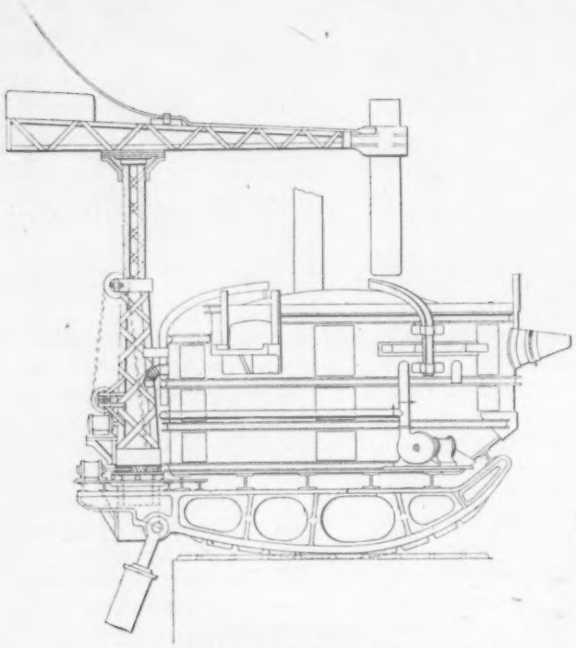


Fig. 1.—The Paragon Electric Furnace.

In order to overcome this, the Röchling-Rodenhauser furnace, which is partly a resistance furnace and partly an induction furnace, was designed. A considerable number of these furnaces have been erected and are in operation abroad, giving very good results. Many steel makers, however, are of the opinion that it would be an advantage if a furnace could allow superheating the slag for refining purposes, but at the same time enable the metallurgist to so regulate the heat of the charge that gases could be expelled without difficulty. At the same time, the perfect circulation of the bath should be maintained so as to secure a perfectly uniform material.

A new furnace on these lines, which the inventors call the "Paragon" furnace, has been designed and protected by patents, which appears to possess points in its favor. As is shown in Figs. 1, 2 and 3, this furnace is a combination of an arc and a resistance furnace, which makes it very much like an open hearth furnace, and it may indeed be worked exactly in the same manner. The slag blanket is kept at the desired temperature by means of arcs playing over the surface of the slag, while the remainder of the heating power is transmitted to the bath by means of terminal plates, such as are used in the Röchling-Rodenhauser furnace.

The result of this combination is that the slag may be heated to any desired temperature while dephosphorization and desulphurization take place, but the heating effect of the arcs need not be increased to such an extent as to keep the whole charge superheated, which, of course, would tend to overheat the steel immediately beneath the arcs, but a carefully regulated amount of current can be sent at the same time through the resistance plates, thus also heating the charge from underneath.

When the dephosphorization and desulphurization are finished, it may be desirable to alter the gradient of heat in the furnace, so that the lower portion of the bath is hotter than its surface, in order to expel the gases more readily. This result is obtained by diminishing the power transmitted through the arcs and increasing the power transmitted to the side plates. In fact, it is even possible to extinguish the arcs for a time and keep the bath liquid by means of the side plates, which for this purpose are provided with a cooling device of enforced air. The metallurgist has, therefore, the power of controlling the gradient of heat in the bath at will.

This combination has another advantage, viz., that the electrodes do not require to be of such large section for a given capacity of furnace as would be the case if the total amount of power were transmitted by means of the arcs only, owing to the fact that normally about 50 per cent. of the total power is transmitted through the arcs, while the other 50 per cent. is transmitted through the side plates. The advantages claimed, therefore, are threefold:

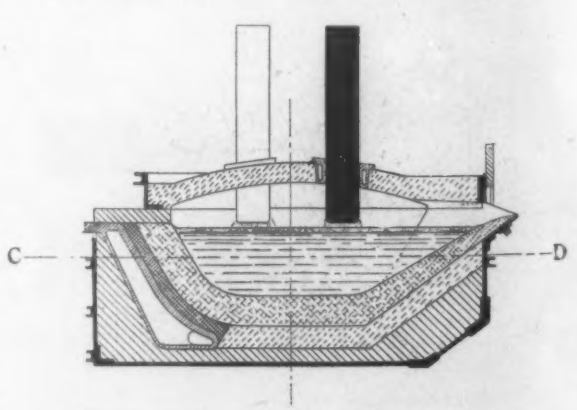


Fig. 2.—Section of Furnace on C-D in Fig. 3.

1. The size of electrodes for a given furnace capacity is only about half that of an arc furnace, and consequently with a given electrode section available the melting capacity of the furnace can be nearly doubled.

2. Owing to the destructive effect of large arcs immediately under the roof of the furnace, the roof very quickly deteriorates, but in the case of this new furnace the roof is not subjected to such severe strain, owing to the reduced size of the electrodes and to the

* From the London *Iron and Coal Trades Review.*

† Of the Gröndal Kjellin Company, London, England. The Paragon furnace will be introduced in the United States by the American Gröndal Kjellin Company, New York.

smaller amount of power transmitted through the arcs; therefore, the maintenance of the furnace costs less, and the roof lasts longer.

3. The control of the load factor of the furnace is better, because the current flowing through the resistance plates is a perfectly steady one, whereby the heavy current fluctuations otherwise caused by large arcs is very extensively compensated.

The result of this is that no special machinery is required either for compensating for the lower power factor of a true induction furnace or designed with a large fly wheel effect, as in the case of a simple arc furnace, on account of its fluctuating load factor. Standard machinery and standard transformers only appear to be necessary, which, of course, decreases the first outlay for the plant, and under the circumstances may prove to be almost a deciding influence.

The power consumption per ton of steel should also prove more economical by means of this combination, as the high temperature of the steel is only required during desulphurization, it being well known that dephosphorization does not require such a hot slag as desulphurization, and it follows as a logical sequence that the higher the temperature of the steel for any length of time, the greater also the heat losses during the process; in view of this, the total melting and refining process should be more economical with this combination. It therefore appears that this type of furnace includes several of the advantages of the induction furnace, viz., a good circulation of the charge, inasmuch as it is heated from below as well as from above, and a high load factor.

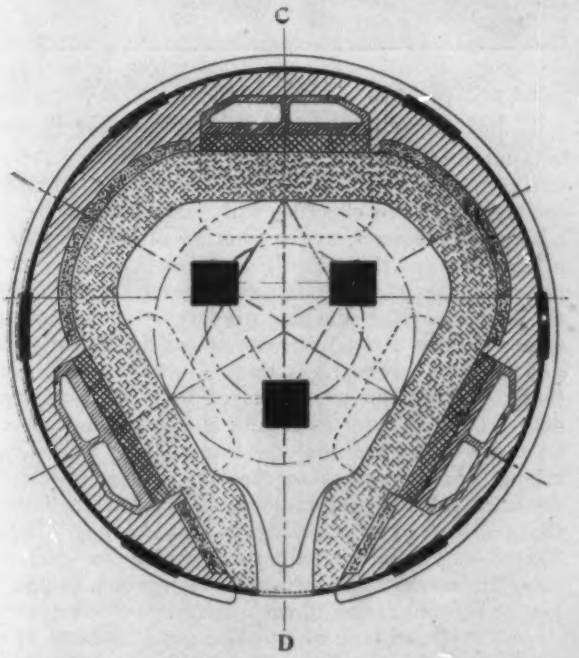


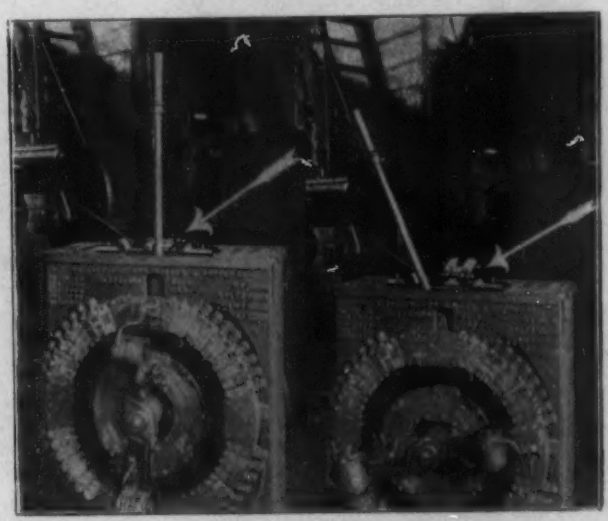
Fig. 2.—Horizontal Section on C-D, Fig. 2, and Part Plan.

No electrical apparatus, in the ordinary sense of the word, seems to be an element of the design of this furnace, because the power supply transformers may be situated in an adjoining building protected from dust and injury, and entirely beyond the reach of the workmen. The low-voltage current only requires to be transmitted to the furnace by means of insulated busbars and cables, which is easily arranged.

The regulation appears to be simple, as if the furnace is operated direct from a generator, the field rheostat controlling the current to the generator is all that is required; or, if transformers are used in connection with an existing power supply, so-called regulating transformers with interchangeable terminal steps are employed. In fact, comparatively little regulation in this respect should be found necessary, because the current in the arcs ought to be easily regulated by altering the length of the arcs, while the current in the resistance plates is more or less automatically regulated by the condition of the charge.

The Kittredge Safety Controller Lock

One of the subjects which received much attention at the recent meeting of the Association of Iron & Steel Mill Electrical Engineers, held at Pittsburgh, Pa., was the importance of increasing the safety factor on the electrical apparatus used in steel mills. Among the appliances exhibited was the Kittredge safety lock for



Two Views of the Kittredge Safety Controller Lock Made by the Delta-Star Electric Company, Chicago, Ill.

controllers manufactured by the Delta-Star Electric Company, 541 Jackson Boulevard, Chicago, Ill. The view at the left shows the controller handle locked in position, and that at the right illustrates the lock released and the handle free to be moved.

This lock consists of a hinged U-shaped metal piece fastened to the controller frame, and mounted so as to engage or disengage the controller handle. The handle is surrounded by two projections on the safety lock when the latter is in the engaging position, and the controller cannot be operated until the lock is released by a special key. By using this lock it is possible for an attendant to lock the controller handle securely against operation by unauthorized persons, thus preventing the possibility of starting the apparatus and injuring it or workmen.

The Steel Car Forge Company, whose general office is in the Frick Building, Pittsburgh, Pa., with works at Ellwood City, Pa., Butler, Pa., and Hammond, Ind., is calling attention to its facilities for making all the forgings necessary to bring freight and passenger cars up to the new safety appliance standards of the Interstate Commerce Commission. These items cover such appliances as grab irons, hand holds, brake steps, ladders, uncoupling levers, drawbar yokes, &c. The company claims that its products can be sold to the railroads cheaper than they can be made in the railroad companies' own shops and promises prompt shipment, as a large stock of such material is carried.

First Roechling-Rodenhauser Furnace in the United States.—An electric furnace of the Roechling-Rodenhauser induction type will be installed by the Crucible Steel Casting Company, Lansdowne, Pa. It will be of 2 tons capacity, and single phase, 25-cycle current will be used, furnished by a generator driven by a 425-hp. oil engine. Cold material will be charged for a time; later a cupola may be used for melting the scrap. The furnace will be built by the American Electric Furnace Company, a connected interest of Naylor & Co., 45 Wall street, New York.

The Sarco Multiple Unit CO_2 Recorder

A New Type of Instrument Embodying Several Distinctive Features

After a series of tests covering 14 months, the Sarco Fuel Saving & Engineering Company, 90 West street, New York City, has placed on the market a new type of multiple unit carbon dioxide recorder. In the design of this new instrument it was endeavored to produce a machine compact enough to be made in a single unit or in multiples thereof up to 10 without excessive weight or bulkiness. All adjustments, such as leveling liquids, &c., have been avoided, and the motive power is made as nearly constant as possible by the use of standard electric motors. It is not possible to obtain more than 15 to 18 records per hour in recorders of the surface absorption type, and the gas is therefore passed through caustic solutions, which enable from 35 to 40 readings to be made per hour. As far as possible glass has been dispensed with, the only points where it is retained being at the seals, where the sample of gas is measured and also where the final operation of recording the CO_2 content of the gas is performed. Elsewhere metal has been used. Figs. 1 and 2 show front and rear views of a six-record unit, while Fig. 3 give details of the construction of the recorder.

The special features of this new recorder are separate units, elimination of all adjustments except the initial one of setting the pen at zero, making simultaneous records, the elimination of time lag, the mixing of the caustic solution in the recorder itself, the elimination of temperature errors, the automatic handling of the liquids used, a pen which inks itself at the end of each stroke and complete absorption of the gas. The motive power for operating the recorder consists of a direct connected motor driven suction fan to draw a continuous stream of gases through the various pipe lines to the machine and a motor driven rotary pump to handle the paraffine oil in the successive operations constituting a cycle for measuring a sample of the gas,

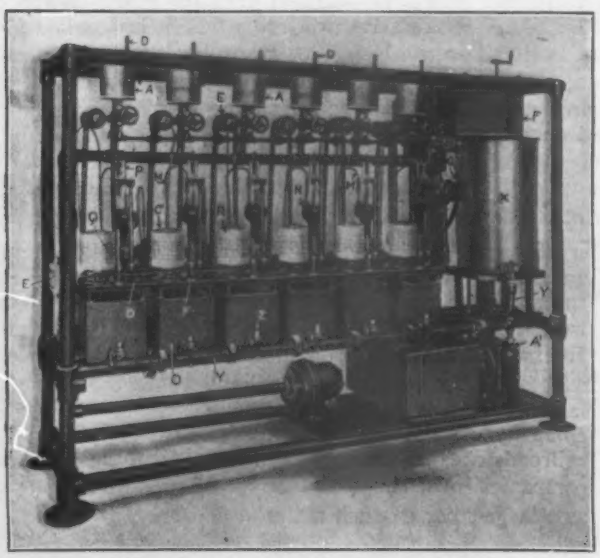


Fig. 1.—Front View of a Multiple Unit CO_2 Recorder Made by the Sarco Fuel Saving & Engineering Company, New York.

absorbing its CO_2 content, recording this value and expelling the sample.

A clock mechanism which is substantial enough to drive the several drums on which are mounted the individual charts for each furnace is used, and a sufficient supply of oil is led to each unit from a central supply tank and performs the successive operations previously mentioned. The recorder is composed of several distinct units, all of which depend upon the same central source of power for their operation. These units are entirely separate, and there is consequently no possibility of the gases from the several furnaces becoming mixed.

The furnace gas is led to the recorder through individual pipe lines, each of which is connected to a seal, A. At the other end of these individual pipe lines is a ¾-in. sampling tube perforated with holes extending into the last pass of the boiler, and a filter is placed just outside the flue or boiler setting to remove the soot

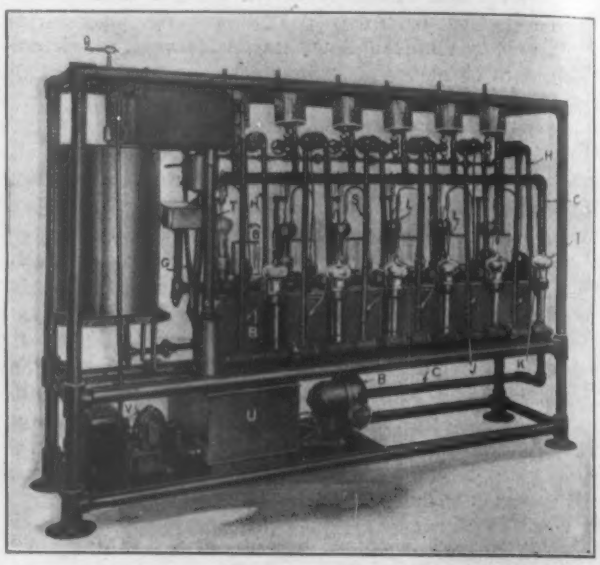


Fig. 2.—Rear View of a Six-Record Machine.

from the gas. On the other side of the filter, the pipe is reduced to ⅜ in. in diameter for conducting the gas to a recorder, this small dimension being used to reduce the time lag. No clogging will occur from using this contracted diameter, as the filtering of the gas to free it from soot and the draining of moisture are done at the boilers. The motor driven suction fan B, located at the bottom of the machine produces the suction necessary to draw a steady stream of gas through the seals and into the internal gas line C, which is connected thereto. The seals are employed to produce an equal degree of suction for each unit, and their efficiency can be easily determined, as they are made of heavy glass tubing, and the gas passes through paraffine oil therein, the inlet D being perforated so as to secure bubbles of the gas instead of a steady flow. The gas is again filtered at the internal filters E, which are cast iron cylinders containing a brush through which the gas is forced before passing to each unit.

An overhead tank of paraffine oil, F, located at the top of the machine supplies the motive power for drawing the gas through each unit. This oil is led to the various units by the line G, and by reason of its head draws samples of the gas through the tees located between the seals and the internal gas line. The gas passes through the inlet lines H, to the measuring or inlet burette I. As the paraffine oil, which is being constantly fed to the units gradually fills the pipe lines J, it rises in each measuring burette to the inlet connection, K, and prevents further gas from being trapped while, as it continues to rise, it forces the gas through the capillary copper tubes L, into the bottom of the absorption vessels O, where it is deprived of its carbon dioxide by bubbling through the caustic potash solution contained therein. The remainder of the gas is forced up through the capillary tube M, into the recording burette N, which is supplied with paraffine oil from the main supply tank and contains a frictionless metal float. The pressure of the gas forces the paraffine out of the burette, and the floats are carried down with the liquid. These floats are suspended from frictionless wheels P, by strong threads, which also carry the pen Q, for re-

cording the CO_2 content of each sample on the charts R. The paraffine oil is continually rising in the riser, S, and the central siphon T, while the record is being made, and the hight of the siphon is such that as soon as the record is completed it starts to flow and passes all of the oil into the discharge tank U, from whence it is pumped to the supply tank by the pump V. This latter tank has a filter for cleansing the paraffine oil and also has an overflow communicating with the discharge tank.

When the siphon starts to flow, the paraffine oil in the system recedes from the measuring burette due to a reduction in pressure, and the gas which has forced the float downward is then passed back into the absorption vessel at the top through the tube L, leaving by the exit tube B, and finally reaches the atmosphere through the riser tubes S. When the siphon has stopped flowing, one cycle is completed, the time being dependent upon the number of records to be made per hour. About three minutes is consumed if 20 records per hour are to be made. The gas is again drawn through the inlets to each unit, and another cycle commences. After each record the pen is automatically inked by return to the inkwell F'. The recording charts R, are mounted on drums, C', which are driven from the clock E', by worm gears on the clock shaft D'. To remove the chart drums it is simply necessary to separate them from their face plates, as the latter receive their motion from spur gears, located on their shanks, which are driven by the worms on the clock shaft.

Sticks of caustic potash are placed in the internal caustic tank X, water added, and the whole thoroughly stirred by an ordinary stirrer. The solution is then fed to each absorption vessel through the line Y, and the plug cocks Z, shut. If desired the remaining solution can be run off through the outlet valves A', and the

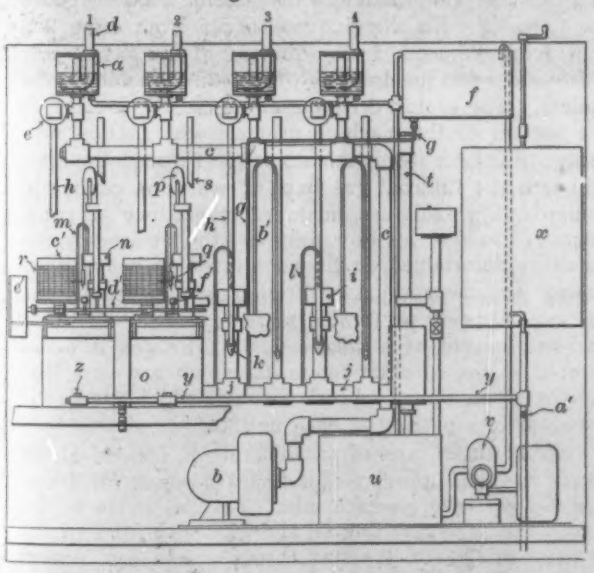


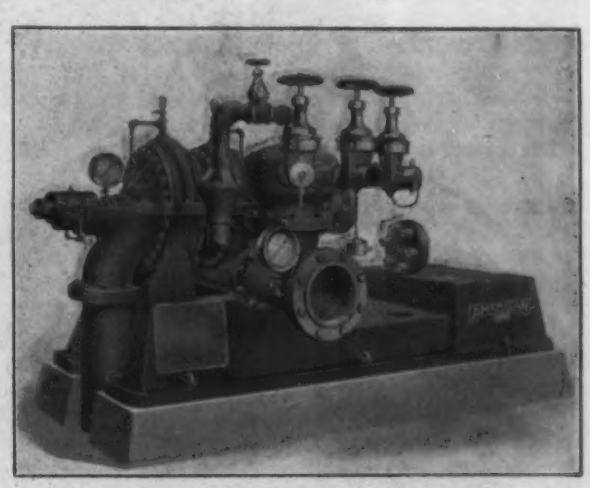
Fig. 8.—Details of the Construction of the CO_2 Recorder.

system washed with water to prevent the solution from crystallizing on the inside of the tank, and the pipe line. When the solution in each vessel has absorbed all the carbon dioxide possible, the plug cocks are opened and the solution run off. The caustic potash solution if made with a specific gravity of approximately 1.25 will last for 10 days, running 24 hours per day, and the paraffine oil is never changed. The ink-well requires filling only once a week, and the only adjustment necessary is setting the pen to zero by a turnbuckle when running on air. Everything else is automatic except the winding of the clock and renewing the charts and the caustic potash solution.

Old Grindstones.—A correspondent desires to ascertain whether there is any use for grindstones which have been worn to so small a diameter that they are no longer available for the original purpose. If any of our readers can suggest some use for such wornout grindstones we will be pleased to receive the information.

The American Centrifugal Fire Pump

Recently the American Well Works, Aurora, Ill., has developed a new type of centrifugal fire pump. It is of the volute centrifugal type, of improved and simplified design, and embodies in its construction the leading features of the latest types of high pressure centrifugal pumps made by this company. Like the pump an efficiency test of which was reported in *The Iron Age* August 4, 1910, this new type has pipe bends of long radius between the stages and the runners and the interior of the casing are machined true and adjusted with the least possible amount of clearance to prevent back flow.



The New Centrifugal Pump for Fire Service Made by the American Well Works, Aurora, Ill.

It is possible in this design to secure from a two-stage pump the pressure usually required in fire service. In this way the additional mechanism and power required by a multi-stage pump to produce this pressure can be dispensed with, and the pump is also more compact. This is an important consideration where the pump is to be installed in an engine room or a basement having limited space. The pump is of the single suction type, with horizontal split volute, and is so designed that the covers may be raised to inspect or repair the runner or working parts without disturbing the pipe connections in any way.

Bronze is used exclusively for the construction of the impellers and the impeller shaft has bronze sleeves, through packing boxes, lantern rings and water seals. The bearings are placed outside of the stuffing box, are babbitted with hard babbitt metal and have removable liners. Ring oilers are used on the main bearings to carry up the lubricant from the oil reservoirs. This arrangement gives constant lubrication without requiring much attention.

The discharge pressure for which the pump is designed is 100 lb. with a suction head of 20 ft. Four sizes are regularly built, having the following pipe connections and capacities:

	No. 4.	No. 5.	No. 6.	No. 7.
Diameter suction and discharge pipes, in..	6	8	8	10
Capacity, gallons per minute.....	500	750	1,000	1,500
Capacity, 1½ in. lines of hose.....	2	3	4	6

The discharge casting with which the pump is provided has the necessary number of hose and discharge valves. It is also equipped with pressure and vacuum gauges and a flexible shaft coupling, and the builder guarantees it to fulfill all conditions of the Underwriters' Association.

Kane & Roach Sheet Straighteners and Automatic Shears

A New Machine with Several Novel Features

Kane & Roach, Niagara and Shonnard streets, Syracuse, N. Y., are manufacturing a new sheet straightener and automatic shears which was invented by W. E. Kane. This machine is intended for straightening sheets or narrow strips of sheet metal from coils and cutting them off automatically to any desired length on the automatic dumping table, which, as its name indicates, discharges them on a truck or into any receptacle. It is made especially compact, but is also heavy, strong and durable, and all parts are readily accessible for dismantling the machine. Fig. 1 is a general view of the machine, while Figs. 2 and 3 show the working and the driving sides of the staightener, respectively.

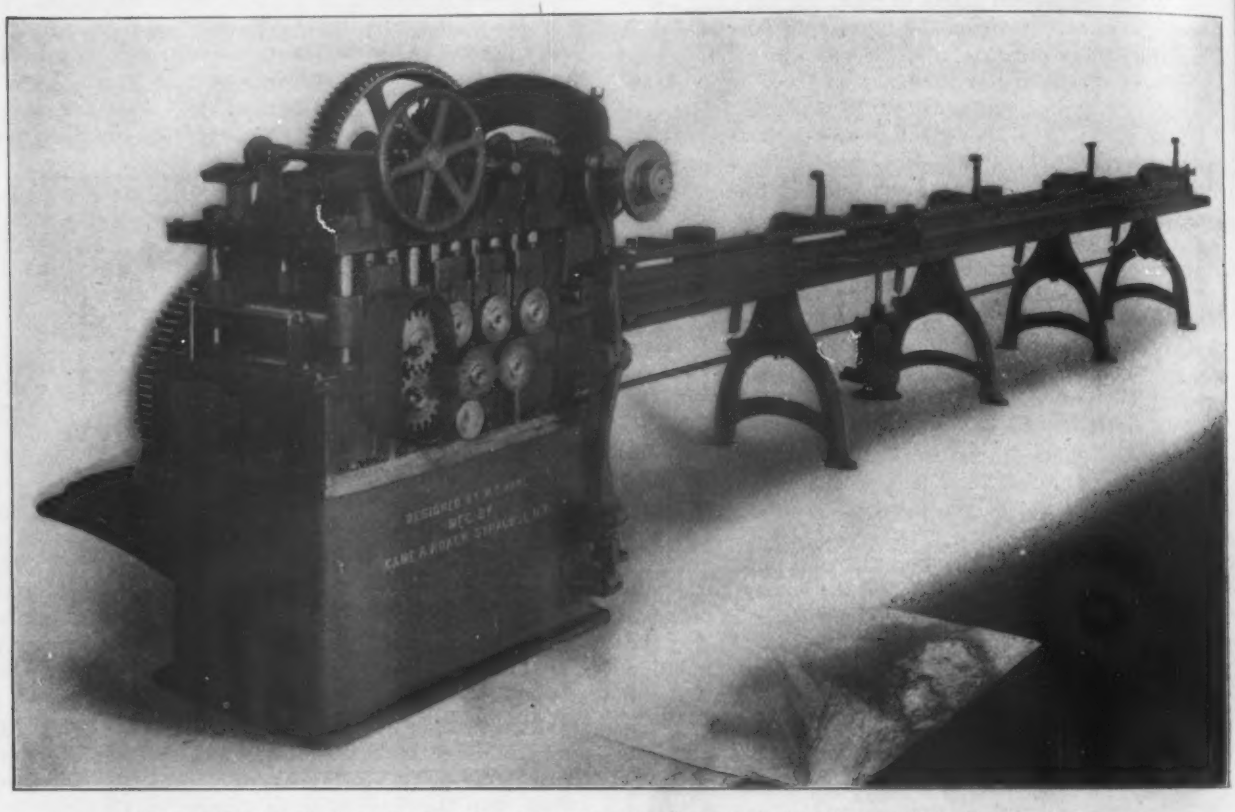


Fig. 1.—The No. 2 Sheet Straightener and Automatic Shears Built by Kane & Roach, Syracuse, N. Y.

The coil of material to be straightened and cut is placed on a reel at the front of the machine, one end being first straightened enough so that it will reach into the machine and be gripped in the first pair of feeding or pinching rolls. This draws the material through the machine, forcing it between the straightening rolls, which are driven by gears. These rolls can be adjusted for any different style of material so as to produce commercially straight work. At each end of the table adjustable gauges are provided which can be set to the width of material passing through the machine. These guide the material to the straightening rolls and along the table, thus preventing it from running off sideways.

A stop gauge in the middle of the table can be set at any desired distance and as the material passes through the straightening rolls it strikes the gauge. This trips the machine and stops the feeding rolls instantly, and at the same time the shears are set in motion, while, as the piece is cut, the cam controlling the dumping lever operates to throw the piece out of the way. As the shears recede from the stock and the table resumes its vertical position, another cam instantly starts the rolls feeding the stock through again, which is repeated as long as material is fed. To prevent noise and jar the table has a dash-pot which stops it at either limit of its travel.

The straightening rolls are arranged with scales and pointer for easily duplicating the proper setting for handling various kinds of work. This is a decided advantage, as once the proper settings have been determinded for the different thicknesses, they can be noted down and on future work the rolls adjusted to the same scale reading. The straightening rolls are adjusted by the crank while the hand wheel regulates the adjustment of the pinching or drawing rolls which in addition to drawing the material through also helps to roll out kinks, irregularities or dents which are not very large.

The machine is driven with two belts, one operating the shears and the other the rolls. Both are driven from the one pulley on the line shaft and one runs under the other. The construction of this machine is very strong. All the journals are of very hard bronze and all the gears are machine cut and very strong.

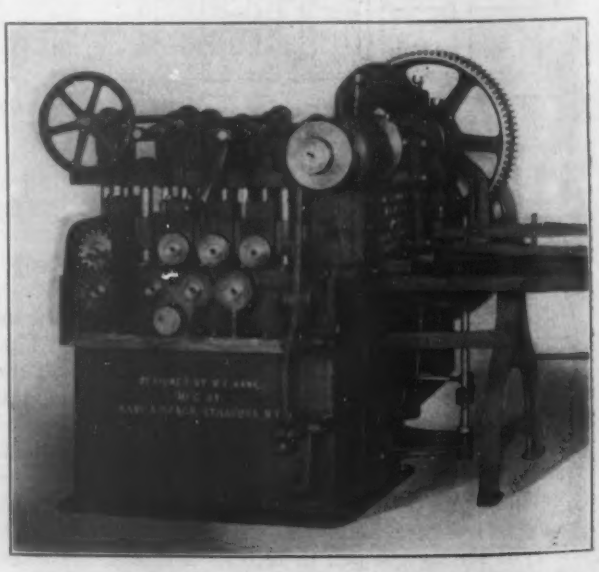


Fig. 2.—The Working Side of the Machine.

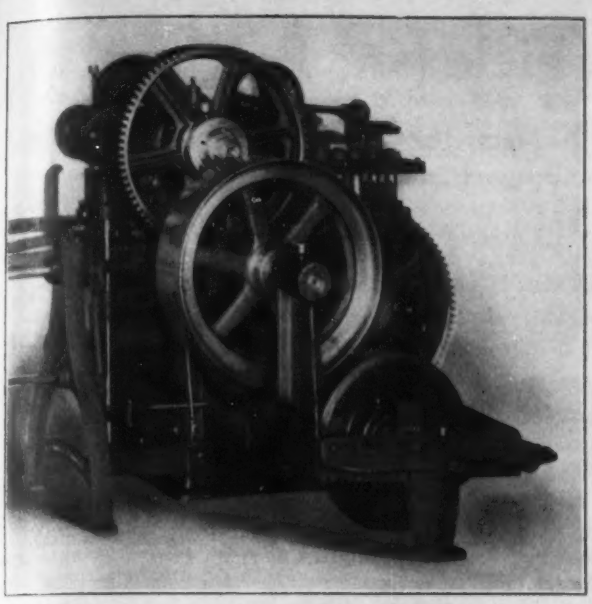


Fig. 3.—The Rear or Driving Side of the Shears.

The machine illustrated will handle strips 14 or 15 in. wide and 5-16 in. thick down to stock 3 or 4 in. wide and ⅛ in. thick, and in some cases stock slightly thinner can be accommodated. This machine can be furnished in different sizes for either lighter or much heavier and wider work, and if desired can also be arranged for straightening shapes other than sheets and flat stock. Any desired length of table can be furnished.

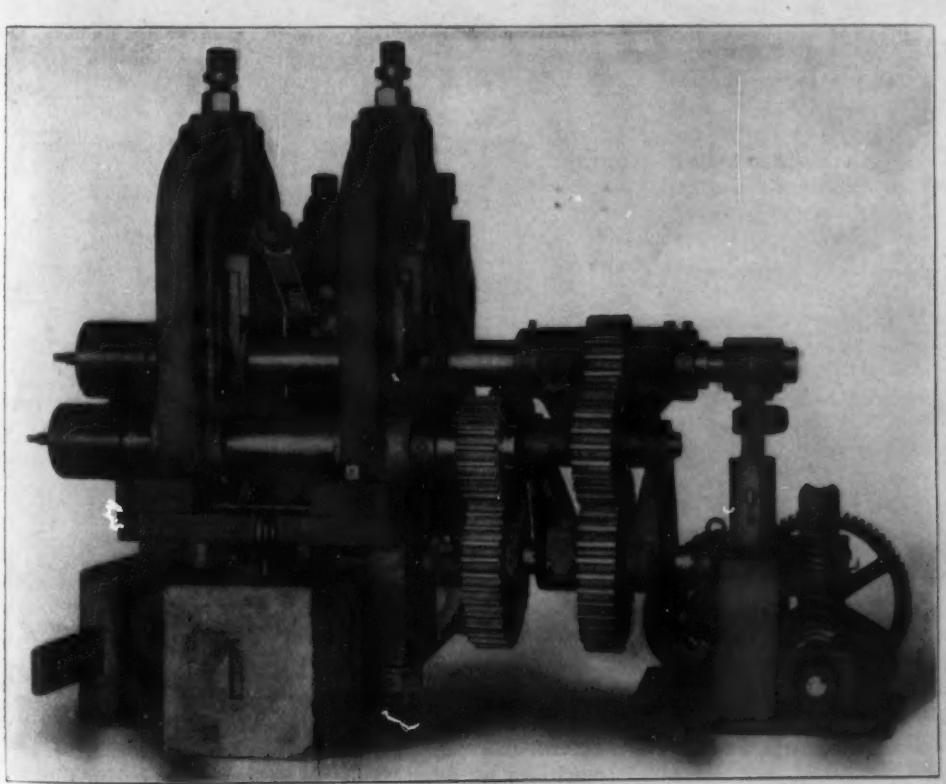
State Arbitration in Pennsylvania.—The Legislature of Pennsylvania, which will begin its biennial session January 3, will be asked to extend the powers of the State Bureau of Industrial Statistics so that it will exercise the functions of a bureau of labor and arbitration. When the bureau was created it was intended to develop the division, which is officially attached to the Department of Internal Affairs, so that it would act in labor matters, but the purpose was never carried out. John L. Rockey, chief of the bureau for the last four years, has called attention to the opportunities for such exercise of State power in reports, and a bill will be drafted to enable the chief of the bureau to extend his offices in labor disputes. It is pointed out by men interested in the project that numerous labor difficulties in Pennsylvania could have been prevented in the last decade by the interposition in a friendly way of State officials.

Danville Bending Machine with Motor Drive

The Danville Foundry & Machine Company, Danville, Pa., has applied the electric motor drive to some of its bending machines. The special line of work handled by one of them is the production of fifth wheels for wagons, but it can also be used to bend small angles and tees.

The essential part of the machine is the three rolls through which the material to be bent is passed. The stock is fed between the rolls on edge and during its passage through the machine grooves in the rolls keep it from slipping to either side, and when it emerges from the rolls, the bar, angle or tee has been bent in the form of a circle. Power is transmitted from the Westinghouse 7½-hp. type CCL motor driving the machine to the rolls through back gears and a countershaft on the motor, a worm and worm wheel and a train of spur gears. A screw in the center of either head enables the top roll to be raised or lowered to vary the space between the rolls to accommodate material of varying thicknesses. Once the adjustment has been made the screws are locked with nuts to keep the adjusting sleeve rigid. The spur gear on the wheel of the shaft of the adjustable roll is moved by an intermediate gear. This gear is connected at the bottom of the main drive with toggle joints, thus keeping the gear in proper mesh regardless of the position of the top roll.

All three rolls are positively driven, and the top one can be raised instantly by ratchets between the two uprights to remove a complete ring without touching the screws in the housings. These ratchets operate on cams that raise the roll, an arrangement which saves much time and obviates trouble in adjusting the top roll to bend another ring of the same diameter. After the completed ring has been removed, the top roll can be instantly replaced when it is ready for bending another ring. As the material enters the machines, it passes through a device on the rear which makes the first bend, so that it can be received in the other rolls.



A Motor Driven Bending Machine for Angles, Bars and Tees Built by the Danville Foundry & Machine Company, Danville, Pa.

One of these machines has been installed in the plant of the Keystone Forging Company, Northumberland, Pa. This machine has turned out about 400 rings, varying in diameter from 28 to 30 in., and made from bars ¾ x 1¾ in. in section in eight hours. It is stated that this output can be considerably increased if the machine is operated continuously. The maximum section of bars handled is ¾ x 2¾ in.

The Machine Tool Field in Belgium*

The Opportunities for American Machines to Meet the Shop Requirements of the Extensive Manufacturing Plants

BY CAPTAIN GODFREY L. CARDEN.

This contribution from Captain Carden of the United States Revenue Cutter Service emphasizes his belief that Belgium is a very inviting market for the tool builders of the United States. This opinion is based upon a study of the conditions existing in that country which he made while a special agent for the Department of Commerce and Labor. In this present article the discussion of the building and use of machinery and machine tools in Belgium begun in "The Belgium Machine Tool Market," which appeared in *The Iron Age*, November 17, 1910, is continued.

The Charleroi Electrical Works are unexcelled among the Belgium electrical plants. The shops are located at Charleroi on the Paris-Liège line of railway. Fig. 1 is a view of the assembling room. The machine tool installation comprises approximately 510 tools of various types and makes. Many of the best American machine tools are in evidence, but the majority of the machines are of Belgium or German origin. I personally inspected these works in company with H. E. Duquesne, secretary of the firm, and Henri Krebs, the engineer-in-chief.

Fig. 1.—The Assembling Department of the Charleroi Electrical Works, Charleroi, Belgium.

The machine tool installation represents a total valuation of $386,000 and, as an evidence of the administrative capacity, I was informed that the company had shown net earnings of $193,000 in a single year. The total capitalization of the firm is $965,000.

The percentage of old tools in service is comparatively small, and new tools are being added constantly. Bullard boring mills are in high favor, and I understand that aside from the merits of its tool this is largely due to personal representation on the part of the Bridgeport firm. There are a number of heavy Niles machines in service which are highly spoken of, and Mr. Krebs declared that taking into consideration weight of metal these Niles tools was fully as cheap as some of the best of the European machines of similar type. He had satisfied himself on this point after careful calculations, since it would appear that Niles machines at first glance were more expensive. An 8-ft. boring mill installed in the plant is shown in Fig. 2. The value of American machine tools is fully recognized in the Charleroi plant, and this is a fact which should be borne in mind by those of our manufacturers who have machines of especial merit to offer.

Belgium is essentially a manufacturing country, and it is safe to say that by far the greater proportion of its output is for export. The competition in Europe to-day is largely one of merit; in other words, the busi-

* Similar articles by Captain Carden on Austria-Hungary appeared in *The Iron Age* March 31 and May 12, 1910, and on Russia June 16, 1910.

ness success of individual firms is essentially based on quality. The locomotive trade emphasizes this and accounts for the painstaking efforts put forth to turn out not only highly developed machines but engines of high finish. To the American mind much of the work on locomotives, stationary engines and other equipment is decidedly unnecessary, but the European trade demands it, and because of the exacting requirements abroad there necessarily exists a demand for high grade tools. Under such circumstances the field readily lends itself to American machines, and if not taken advantage of the fault lies with the selling connections at home. In Belgium, especially, the writer has frequently heard it remarked by responsible heads of firms that they would gladly welcome an opportunity to pay the prices demanded for machine tools in the United States plus the cost of transportation and installation. It cannot be denied that Belgium manufacturers more or less feel that they are at a disadvantage in comparison with American buyers, aside from all questions of transportation, tariff, insurance charges, &c. As a further instance there is the statement of Director de Jonge of the Minerva Works, of Antwerp, who is on record as saying that his establishment does not hesitate to buy direct from America and that by so doing there is often effected a saving of from 20 to 25 per cent., and this includes the payment of a commission to the factor in America and the transportation of the machines from the United States to Antwerp. So far as Belgium manufacturers are concerned the impression becomes forcible that they ask for nothing better than to be placed on the same basis as the American buyers. They cannot understand why there should be any discrimination against Belgium any more than between States in America, and always with the understanding that they expect to pay in addition the charges incident to duty and transportation.

Small Arms Plants

Belgium has long been recognized as one of the greatest manufacturing countries of the world for small arms, and Belgium shot guns and rifles have generally been offered on the market at especially low

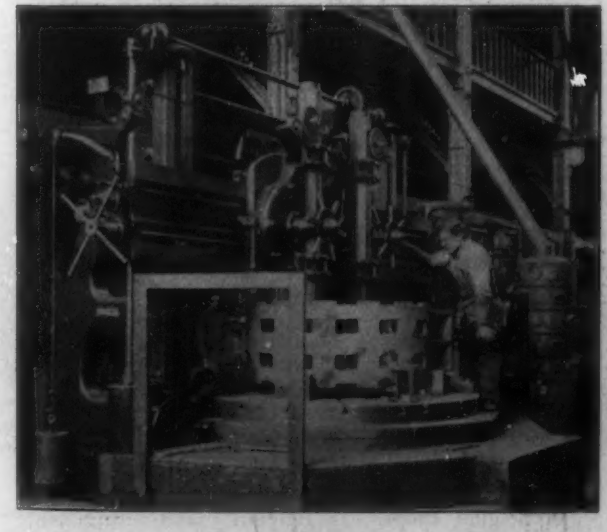


Fig. 2.—An 8-Ft. Boring and Turning Mill at the Charlerol Electrical Works.

figures. Liège is the principal city in Belgium for the manufacture of sporting arms, and until comparatively recently practically all of the work has been performed in the houses of the workmen. Even now as one walks along the streets of Liège one meets at almost every step boys hurrying along with bundles of gun barrels on their shoulders, or perhaps girls carrying bundles of gun locks or breech mechanism. In many of the homes the workmen have managed to instal a few small machines, and by working a few hours every night are enabled to earn additional compensation. This work is performed by men who are ordinarily employed otherwise during the day. The works of some of the best gun firms in Belgium are little more than assembling shops, the real detail work being undertaken in the homes. This arrangement undoubtedly cuts down the overhead expenses and permits selling at extraordinarily low figures. Recently, however, there has been established in Liège, in the very center of this hand-working community, a great plant which is undertaking

Fig. 3.—The Type of Field Guns Manufactured at the Cockerill Works, Liège-Seraing, Belgium.

to manufacture both sporting and military rifles wholly within the works, and under the assumption that through the medium of the most modern types of machine tools even the hand work of the Liège people can be undercut in point of economy and an enhanced output capacity secured. The writer refers here to the Pieper works. Just now the Pieper plant is engaged in the manufacture of sporting guns, rifles and automatic pistols, but in the course of time Pieper will be enabled to handle large military rifle orders and ammunition contracts.

The machine tool installation at Pieper's is an exceptionally fine one. Director Goebel, the head of this fine establishment, has visited the United States and is familiar with many of the best American machine tools. Pratt & Whitney secured a large order with this house, and this statement in itself is evidence of the high grade equipment sought after. Such foreign tools as are in service represent the best on the market, and I have no hesitancy in saying that there are no cheap tools on the Pieper floors. Jaspar of Liège has been drawn upon to supply 200 milling machines with automatic attachment and overhanging arm. Jaspar is making one size only of plain miller built on Richards' designs; the price asked for this machine is $530.75 with an agent's discount of 20 per cent. The small miller sold by Jaspar to Pieper with automatic attachment and over-hanging arm brings $145. Director Geobel expressed the opinion that shapers, profilers and small milling machines, so far as the European market is concerned, are covered by sufficiently good European made tools, but with reference to many other machines he was decidedly in favor of American make and declared that the prices charged for some American tools were not too high, since the machines warranted the same by reason of the high grade work produced. In this latter category he took especial pains to mention Warner & Swasey hexagonal turret lathes. The total number of machines installed at Pieper's approximates 1100 and represents a payment in cash of $289,500.

The Pieper Works are employing many women operatives and these women are assigned to lathe, turret lathes, small and Lincoln millers, gun barrel lathes, drills, &c., their wages varying from 58 to 67.5 cents per day. Foremen are paid 45 centimes (8¾ cents) per hour. The wages paid to good tool men vary from $1.35 to $1.45 per day, a day's work comprising 10 hours. At the time of the writer's visit the Pieper establishment was employing 900 people.

Just outside of Liège in the suburb of Herstal is located a large military arms manufacturing plant, known as the Fabrique Nationale d'Armes de Guerre Société Anonyme. This establishment is to Belgium what the Springfield Arsenal is to the United States, with this difference that the Belgium plant is a private

Fig. 4.—Machine Tool Installation in the Gun Department of the Cockerill Works.

concern. The Belgium Government looks to the Fabrique Nationale for the manufacture of the necessary small arms for the army, and the entire re-arming of the Belgian military forces has been effected through the outputs of this plant. The Belgian forces absorbed 300,000 Mauser rifles from the Fabrique Nationale, together with the necessary complement of small arm ammunition. The Fabrique Nationale as at present operated dates from 1889; this concern has an output capacity of 350 military rifles per day, 200 carbines, 150 sporting guns, 800 pistols, 400,000 cartridges, 150 bicycles, 50 motorcycles and 5 automobile carriages. The plant is divided into four departments for the manufacture, respectively, of small arms; ammunition, bicycles and motorcycles, and automobiles. There are very many American machine tools in the Fabrique Nationale, but German tools are mostly in evidence. The machines for ammunition manufacture are almost exclusively of German make. American tools are found to a considerable extent in the small arms department, and in the automobile shops American machines are easily in the lead. Machine tools are being constantly bought and at the time of my visit I observed equipment under installation from the Pratt & Whitney shops. The Fabrique Nationale is practically independent of outside firms and manufactures nearly all essential parts on its own account. Here as in the Pieper works many women are employed, and the average rate of wages is therefore low. Ten hours constitute a working day.

The Cockerill works at Seraing, another suburb of Liège, devotes an important part of its plant to the manufacture of military equipment. I referred to the Cockerill works in previous writings. This establishment is manufacturing all field guns required by the Belgian military forces and is drawn upon to furnish much of the material absorbed in the seacoast fortifications of Belgium. Fig. 3 shows some of these guns. Ordinarily the Cockerill works employ about 10,000 men. This is one of the oldest plants in Belgium and dates its history from 1817. The gun shops, the interior of which is illustrated in Fig. 4, are probably the most modern of the Cockerill plant and five years ago new tools were installed to the total valuation of $115,800. The finish and accuracy of the Cockerill guns have won for them the admiration of the Belgian government. Until comparatively recent Belgium has been accustomed for years to buy only Krupp material. It was at the Cockerill works that John Ericsson of the Monitor fame, saw service from 1825 to 1827. There Ericsson studied and designed the construction of his steamer designed to be fitted with boilers of high pressure, having interior furnaces operated under air pressure. The designs also called for engines operating with surface condensers.

The workmen at Cockerill's are generally called upon to perform 59 hours of service per week. Pay days are fortnightly and on Saturday, and on pay days the shops close at 4 P. M. Some idea of the daily rate of pay may be gained from the following table:

	Francs.	Cents.
Lathe men	5	96.5
Milling machine hands	4.50	87.5
Planer men	4.50	87.5
Drilling machine hands	3.75	72.5
Turret lathe men	4	77.2
Boring and turning mill operators	5	96.5
Foremen in charge of machine tool groups	7	$1.35

Belgium is too often regarded as a cheap market. Wages are cheap when compared with wages paid in the United States, but it must be borne in mind that some of the best machine work in Europe is turned out from Belgian shops. If Belgian manufacturers are able to offer low quotations on output it is because they understand shop necessities and are enabled to economize in other ways than on wages. The Belgians thoroughly understand machine tools, and as an evidence one will generally find only the best grades of American machines installed on Belgian floors. To American manufacturers this statement of fact based on personal observation should be sufficient to indicate the possibilities of the Belgian market. American machine tools, it is almost needless to say, can generally be depended upon to win in that field where the requirements are based on merit, provided always that the representation behind the tools is of an intelligent American sort.

The Coke Industry and the Foundry

Cupola Practice as Modified by Character of Fuel

Bulletin 3 of the Bureau of Mines is a monograph of 32 pages by Dr. Richard Moldenke, secretary of the American Foundrymen's Association, entitled "The Coke Industry of the United States as Related to the Foundry." Dr. Moldenke carried on investigations at the fuel testing plant of the United States Geological Survey in 1904 to 1907, being particularly interested in tests of various cokes in the cupola. The equipment and other details of the tests were covered in a previous publication of the Geological Survey. The present pamphlet is devoted to a review of the lines on which the coke industry has developed, but more particularly to features of practice in the use of foundry coke, the conditions and phenomena of a cupola heat and the modifications in cupola charging practice required for the use of various cokes. In the section devoted to "Coke in Foundry Melting," Dr. Moldenke discusses charging methods and the uncertainties of cupola melting and urges the adjustment of practice to fuel. He refers to the advantages of retort oven coke, including uniform analysis and the desirable size and shape of the lumps. The absence of thin fingers accounts in part for the success of retort oven coke when first used in foundries. Charges of coke that have lumps of uniform shape and size give results similar to those obtained by using anthracite. A milder or stronger blast should be used according as the coke is light or heavy, and the relative weights of the metal and coke charges on the bed should be changed. Where heavy charges are used, coke with a large percentage of volatile matter should be avoided.

Referring to the tests made at St. Louis, attention is called to the results of heats in which heavy coke was used. These included burned iron at the beginning of the heat and unmelted iron in the cupola drop. It is suggested that no change in coke be made without trial heats to show how to use it. Coke producers are urged to make thorough melting tests with their coke, so that when selling it they can advise foundrymen how to get the best results. Foundrymen are advised to insist on penalties for excess of moisture, to guard particularly against the occluded water resulting from quenching at retort ovens.

Troubles from Burned Iron

Concerning burned iron in the cupola and its effect on castings, the author says that whatever cause may be put forward for pin holes, excessive shrinkage, draws and cracks in castings, practically all of these troubles can be traced back to burned iron.

Pin holes are due, not to the inability of the air to get out of the molds fast enough, but to the yielding up of dissolved gases in the iron at the moment of set. The first thing that happens in the mold, if the iron poured is not much overheated, is the setting of a thin skin of metal against the sand, and hence these gases, in going upward and outward to escape strike the thin shell that has set and stay there. When the casting is put on the planer and the skin is removed the pin holes make their appearance and the casting is condemned.

The evils of high sulphur are nothing, the author says, compared with burned iron and a little oxygen can do a great deal of damage. Only a small amount of aluminum or titanium needs to be added to the ladle to produce the desired deoxidation.

Small and Frequent Charges of Fuel

Dr. Moldenke takes up the question of depth of fuel bed, and recurs again to the advocacy of small charges, reducing to a minimum the fluctuation in position of the effective part of the coke bed. He recommends, in addition to uniform charges, making them so small that the layers of coke are only thick enough to cover the layers of metal, unless the definite knowledge regarding the range of the melting zone of the cupola permits heavier charges.

The question of the adjustment of the bed comes in for extended consideration. Making up the charges in the yards is advocated, as well as the use of special charging buckets with swinging bottom doors to drop the charges exactly as laid. In conclusion the author gives this summation of his discussion:

In this description of a cupola heat the foundryman may find suggested a method by which he can make use of practically any kind of coke. If the coke is heavy—almost like anthracite—he can use fairly heavy charges, as the fluctuations of the melting zone will be slight. If the available coke is light, he absolutely must take small charges, the smaller the better, for large charges would result in too strong combustion and perhaps in red hot coke near the charging doors. The limit for lightness is set only by coke so light that combustion takes place too rapidly and the iron cannot take up the heat fast enough. This limit is quickly found in practice. The methods of making all varieties of coke, and particularly those made in retort ovens, are now fairly well settled, and hence foundry coke is made a specialty at only those plants that can obtain the right kinds of coal for the purpose—that is, these coke makers have coals of various kinds available, which when ground and mixed give the desired result.

As retort oven coke, it is hoped, will be the foundry fuel of the future, the coke makers by careful study of details will probably bring about a very uniform product, with so slight variations in composition and physical structure that a method of operation in the cupola, such as that outlined above, will give uniform satisfaction to the user. In the meantime, however, we have to do with existing conditions. We have coke with low and with high sulphur, coke with low and with high ash, and occasionally coke so soft as to be very near the danger limit. By the very nature of the process of making it coke cannot be uniform in structure, and only careful selection from the ovens as they are discharged gives the foundryman what he is paying for. In brisk times this selection is likely to be made less conscientiously, coke forks being discarded or their prongs made closer. Many coke tests have shown conclusively that much can be done to improve a coke by adapting the process of making it to the requirements. This matter will be treated more fully in another bulletin of the Bureau of Mines.

Mine Rescue Station at Pennsylvania State College.—At the Pennsylvania State College School of Mines, on the evening of December 5, was opened with appropriate exercises what is believed to be the first mine rescue station to be established in the United States by a school of mines. Its purpose is to give instruction in the use of mine rescue apparatus. It is equipped with two Draeger oxygen rescue helmets, with all necessary apparatus, one Draeger pulmoter for causing artificial respiration, safety electric lights and safety lamps. It has a large "smoke room" built gas tight, in which noxious and unbreathable gases may be liberated, and in which the men may be trained in the use of the helmets in such atmospheres. In this room is a large wooden structure representing a full-sized portion of a mine entry with an overcast, and students are trained to enter this with the helmets and, working in the noxious atmosphere, to build brick stoppings, to climb through the overcast carrying loads, and to do other work such as would have to be done by a rescue party. The room is provided with glass doors and windows which permit the interior to be seen from the outside.

The new No. 6 mill of the Reading Iron Company, at Seventh and Laurel streets, Reading, Pa., has been started on single turn. When in complete operation this mill, which has heretofore made wrought iron pipe up to 13 in. in diameter, will be able to make up to 24 in., for which the latest design of pipe mill machinery is being installed. The company's No. 5 mill has been shut down for general repairs.

The Joan D'Arc Mfg. & Supply Company, St. Louis, Mo., manufacturer of the Lynch packless valve, the Marquette relief globe and refrigerating and ice making machinery without the ammonia process, will

move its Louisville, Ky., plant early in the spring to a new location, which has not yet been decided upon. The company has offers from several cities, and expects to reach a decision in the near future.

Welfare Work in the Shops of J. H. Williams & Co.

A little more than a year ago the Welfare Department of the National Civic Federation sent out a number of circular letters to prominent manufacturers throughout the United States asking for information as to their experience with welfare work in industrial establishments. J. H. Williams & Co., Brooklyn, N. Y., manufacturers of drop forgings, have been prominent in this line of work for some time, and the following letter written by the late J. H. Williams, Sr., gives the important features of the work as it existed a year ago, with the exception of some slight revision of figures to bring the data up-to-date:

Our employees, numbering about 500, residing largely in the immediate vicinity of the factory and our restricted city location, precludes the successful establishment of some institutions, such as dining rooms, social clubs, entertainments, evening instructions to apprentices, &c. Our situation in the midst of a city also prevents any attempt at athletic and recreation grounds, gardens and housing of workmen. But we are sensible of the responsibility of employers to employees, and have, therefore, observed some of the conditions of health, safety and comfort. Our aim has been with our employees:

To establish good will, good fellowship and friendly spirit.

To lighten their labors and show interest in their welfare.

To promote interest and cheerfulness by fair treatment.

To never interfere with the freedom of individual conduct.

To avoid paternalism or giving with condescension.

And, above all, to express our appreciation through good wages.

We do not discourage labor unions among our employees, and are not opposed to labor organizations in general. Our working time since March, 1901, is nine hours a day. Piece work is adopted where practicable, but under a regulated or unchangeable system, so that piece work rates are never cut while the condition of production remains unchanged. We avoid arbitrary rules, and adopt as few rules generally as possible. Endeavoring to keep somewhat in touch with our employees and not overlooking the ethical side of our relations, we have enjoyed for the 26 years since our business started satisfactory co-operation, which has encouraged us to establish the simple conditions that follow.

As to the results in the way of influence upon the men, while we make no pretensions as to welfare work, we believe from our observations that the influence of a single institution of this kind is barely noticeable, but collectively and where other general conditions throughout the factory correspond, and where no spirit of paternalism exists, the results, though indirect, are excellent, and the appreciation, although not often openly acknowledged, is apparent. In our own experience we have been more than compensated for any expenditure and trouble from the demonstration that the establishment of one good condition stimulates an interest in and leads to others.

Fire Protection.—Complete equipment of all modern appliances, with organized department.

Accident Prevention.—Complete so far as the best authorities can suggest, and exceeding the requirements of the laws of the State of New York.

Baths.—Established in 1893, and the first, so far as we are aware, in a manufactory in this country. Notwithstanding that they are conveniently located in the same rooms with the lockers, that the temperature of the room is comfortable at all seasons, and that they are always clean and in good order, with an abundance of hot, as well as cold, water, they are not used quite as much as could be desired. Some of the men use them regularly, some on Saturdays only and some not at all; others who have facilities at home prefer bathing there. They are patronized mostly in the warm season; even then not so generally as would be expected. This can be accounted for from a desire on the part of the employees to leave the premises as quickly as possible at the termination of the day's work, and also from the fact that, not having acquired the habit in early life, as is being taught in Germany, they are generally slow in adopting a custom of daily or frequent bathing. The original baths, however, are not a failure, for we have since erected more, and on a larger scale, in the newer and extensive addition to our factory. These have been erected in the toilet rooms or lavatories, and made more attractive than those originally erected, thus hoping to still further encourage their use.

Cooling System.—Air is drawn from a point above the roof by powerful fans and distributed through each forge building until it descends over each man's head through an adjustable pipe under his control, thus assuring an abundant supply of pure, cool air, which enables the men to work with comfort during the warm months.

Drinking Water.—Refrigerated with a 5-ton De La Vergne apparatus, drinking water is furnished and piped to different departments throughout factory at a temperature of about 40 degrees.

Sanitary Conditions.—Machine shop floors are scrubbed every week, cuspidors supplied, general cleanliness observed, good light and artificial heat exist and ventilation has received special attention in the additions and alterations as completed.

Grinding and Polishing.—This room is equipped with the usual system for exhausting dust.

Library.—Books from the City Traveling Library, as well as from our own permanent one, are at the disposal of the employees and their families.

Mutual Aid Association.—A successful organization was established some years ago, and it proves to be of advantage and interest beyond its primary object, for under its auspices and for its benefit a ball or theater party occurs every winter and a picnic or other outdoor entertainment every summer. Besides, other functions originate and are carried out through this organization.

Hospital Fund.—We encourage during the holiday season a collection among our employees for the benefit of one of the city hospitals. This annual fund in 1909 was $227.50, employees and the company contributing equally.

Insurance.—Coupled with other insurance we include the tools of our die sinking, &c., employees, the values based upon lists furnished by the workman.

Savings Fund.—Employees have the privilege of making a weekly deposit, or instructing withdrawals from their weekly pay in sums of 20 cents to $5 in multiples of 10 cents. The amount so received is invested for best returns. Depositors are entitled to loans within the amount of their deposits, but rights to profits otherwise accruing thereon are nullified thereby. Earnings average from 5 to 6 per cent. per annum. The fund, distributed about the time when the works are closed for a week of annual repairs, is largely used for vacation purposes; distribution in 1908 was $15,876, and the net profit on investment, $214.88.

Komposite Anti-Friction Metal.—The Komposite Metal Company, Land Title Building, Philadelphia, Pa., has established a plant in that city for the manufacture of high grade metals and making a specialty of a journal bearing metal. It has extremely high wearing qualities and melts at a temperature ranging from 575 to 700 degrees F., according to the grade of the metal, or about 70 degrees above the high tin metals. It has a higher bearing strength and its lubricating qualities are also claimed to be much higher than babbitt. Komposite metal, as described by the company, is not a mechanical mixture of so many parts, but "is a composite metal, scientifically prepared and chemically united, the chemical union of the various metals being thorough and complete," thus preventing them from separating when cooling. This metal carries the maker's guarantee. It is furnished in various degrees of hardness, graded from No. 1 to No. 4, for heavy machinery and severe work down to light work, and covering all requirements of machinery and shafting. In remelting Komposite anti-friction metal the molten metal should be stirred with a stick until the froth leaves the surface, when the addition of a small piece of rosin before pouring will insure the absence of blowholes from the cast bearing. Mandrels and journals should always be heated somewhat before pouring the metal into the box or bearing.

The Western Steel & Iron Works, De Pere, Wis., has disposed of its posthole auger business, including patents and machinery for auger manufacture, to the Hall Mfg. Company, Monticello, Iowa, engaged in a similar line. The Western Steel & Iron Works will hereafter devote its entire attention to the manufacture of cow stanchions and barn equipment.

New Tools and Appliances

This is essentially a news department for which information is invited.

A New Portable Oxy-Acetylene Outfit.—Alton, Laine & Co., 420 Jackson avenue, Long Island City, N. Y., have recently placed on the market a portable oxy-acetylene welding outfit known as the Astra, which will handle all classes of welding. The equipment furnished includes one oxygen storage tank, an acetylene storage tank, two reducing regulators with gauges, safety devices for both gases, a welding torch, hose, goggles and wrenches. One of the repairs recently made with one of these outfits was the successful welding of a 4-ton water jacketed dynamo bearing which had cracked.

Muffle Furnace for High Speed Steel.—The Bellevue Furnace Company, Detroit, Mich., is manufacturing a muffle furnace for high speed steel employing oil as fuel. The brick lining is grooved and curved and serves as the flue which carries the flame from the inlet to the outlet of the furnace in a continuous spiral. The muffle is supported by the spiral remaining between the grooves. To make the furnace adaptable for certain forms of steel which are apt to warp from the extreme heat when treated in a horizontal furnace, the position of this furnace can be easily changed from the horizontal to the vertical, thus giving practically the equivalent of two separate furnaces.

Semiportable Riveter.—The Electrical Machinery Sales Company, 39 Loan & Trust Building, Milwaukee, Wis., has placed on the market a semiportable riveter for handling the large line of work that manufacturers have been doing heretofore by hand and a hammer. It is claimed that with this riveter one boy can do the work faster, more evenly and satisfactorily than two men. This riveter can be operated horizontally, vertically or upside down, and one special feature is that the rivets may be placed in the holes by the operator on the outside of the work and a head formed on the inside. Another special feature is that the rivets can be driven through the material and headed with one pressure of the lever.

Automatic Lubricator for Pneumatic Tools.—The Lagonda Mfg. Company, Springfield, Ohio, has recently developed a new type of lubricator for use with the boiler tube cleaner, which was illustrated in *The Iron Age* March 17, 1910. It is also adapted for use with all sorts of pneumatic tools. The lubricating device consists of an oil reservoir and is attached between the cleaner and the air hose. The reservoir is filled with oil before the cleaner is inserted in the boiler tube and the flow regulated by a screw as circumstances may require. The oil flows from the reservoir into the air passage and is thoroughly mixed with the air before entering the cleaner. To guard against the supply of oil being exhausted before the tube has been finished the lubricator has a sight feed oil cup, from which the oil is conveyed to the tube through a separate flexible metal hose placed inside the rubber air hose. This lubricator can be placed on the wall or any other rigid object, and is thus neither in the workman's way nor subject to derangement by the vibrating tool.

New Boring Machine.—The Rochester Boring Machine Company, Rochester, N. Y., has brought out a No. 4 floor boring machine. As compared with the previous size, which was illustrated in *The Iron Age* June 30, 1910, the new machine has a 4½-in. spindle as against the 3⅜-in. spindle of the other size; 12 spindle speeds instead of 10; 16 feeds for boring and drilling which is double the original number, and 8 milling feeds in place of 4. The machine handles 8-ft. pieces, between the outer support and the saddle. The vertical traverse of the saddle is 60 in., and the horizontal traverse of the column is 84 in. A 7½-hp. motor is required. These are the specifications of the standard machine, which may be varied to suit requirements. The machine is arranged to do slotting, a valuable adjunct for such work as keyways. In general mechanical details the tool is similar to the original machine, including the continuous traverse for any length of bar. Steel gears are used throughout, all of them inclosed and running in oil.

A Planer with Inclosed Driving Gear.—With the view of improving the efficiency of its line of planers the Cleveland Planer Works, Cleveland, Ohio, will hereafter make its open side Cleveland planers with the driving gear inclosed in a casing. With this change all of the driving mechanism of these planers except the bull gear and the bull gear bearings will be entirely inclosed. A pad is cast on the side of the bed, and to this is bolted an oil-tight casing which serves both as an oil pocket and a gear covering. This permits the running of the gear in oil and prevents danger of insufficient lubrication when the machine is operated by a careless workman. It also keeps the dust and chips from working into the gear, thus giving a quieter running machine and a longer-lived gear.

Electrically Driven Planer.—The Knecht Planer Company, Cincinnati, Ohio, has added to its line an electrically driven planer in which gearing reverses the table and the driving pulley and belt run continuously in one direction. The drive is by a belt from an electric motor on the housing to the main driving pulley, and it is so arranged that the power used on the forward and the return strokes are independent of each other, thus giving different cutting speeds and a constant return. The reversing pulley, like the main driving pulley for the cutting stroke, runs continuously in one direction, and is held during the cutting stroke by a pawl and ratchet which is released at the end of the stroke just before the reversing belt, which is shifted in the usual way, is moved to the pulley. As soon as the pulley is released it begins to move and is in motion at the time the belt is shifted, thus relieving the motor of any heavy loads. The feed mechanism is positive and independent of the driving mechanism, being actuated by a clutch which is tripped at each end of the stroke. The boxes through which the movements of the feed are transmitted are mounted on each end of the cross rail, so that the feed can be controlled from either side. The range covered is from 1-64 to ¾ in., increasing by 64ths, and a conveniently located lever provides for any desired variation within these limits. A handle on top of the feed box enables the feed to be engaged or disengaged without disturbing its direction or amount, and another at the center permits a fast traverse to be transmitted to the slide that is connected for feeding, a feature that saves considerable time, particularly when setting or testing work.

A High Speed 30-In. Light Radial Drill.—The Midland Machine Company, Detroit, Mich., has recently placed on the market a new radial drill for rapid drilling and tapping, which is said to be adapted to a wide range of work and to be also accurate, convenient and efficient in its production. The tool is said to combine all the advantages of the sensitive drill press with the high productive capacity of the radial drill. It is compact, accurately built and is easily manipulated by levers within close reach of the operator. The arrangement for reversing the spindle and furnishing additional speeds consists of a continuous belt running around four pulleys, two on the vertical shaft and two on the horizontal one, with clutches between each pair of pulleys that are operated by separate levers. Moving either lever reverses the direction of rotation of the spindle, and if both are moved simultaneously three additional speeds are rendered available.

Driving Wheel Lathe Dog.—S. W. Putnam, general superintendent of the Putnam Machine Company, Fitchburg, Mass., has invented a new type of lathe dog in which the sliding serrated jaws are drawn back so as to move this surface toward the lathe face plate and hold it in this position by a latch. After the wheel is mounted the dogs are released by tripping the latch and grip the tire with their serrated surfaces. The dogs on the opposing face plate are set in the same way and the tire set in motion. The motion of the tire will then tend to make the dogs grip it in proportion to the resistance of the cut and keep it from slipping.

Trade Publications

Calendar.—Hickman, Williams & Co., The Rookery, Chicago, Ill. Size 9⅛ x 15 in. One of the novel features of this calendar is having the dates begin with December 15 and cover an entire year instead of commencing at January 1, thus bridging the gap which generally occurs at the end of a year. Each day has its own separate leaf, and the month and day of the week are printed in clear type and the date is given in figures measuring 6¾ in. high and proportionately broad.

Shafting, Hangers and Pulleys.—The A. & F. Brown Company, 172 Fulton street, New York City. Catalogue and price-list. Size 4½ x 7¼ in.; pages 112. Gives general description and specifications for a number of different styles of shafting, hangers, pulleys, &c. Tables of dimensions are included for some of the specialties covered and an extensive index completes the catalogue.

Counting Machines.—The C. J. Root Company, Bristol, Conn. Catalogue. Relates to the Bristol, Elm City and Ro-co counters, all of which are illustrated. *The Iron Age*, July 7, 1910, contained an illustrated description of the Ro-co wire measuring device.

Air Compressors. — Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 4025. Briefly describes the Allis-Chalmers motor-driven air compressors and calls attention to a few of the many applications to which this type of apparatus is adapted.

Gasoline Engines. — Charles A. Stickney Company, St. Paul, Minn. Brochure. Illustrates the various types of Stickney engines, which are made in seven sizes, ranging from 1½ to 16 hp., and the different uses to which they may be put, together with the St. Paul engine, which is designed for installation in buildings protected by fire insurance. This engine is manufactured in six sizes, ranging from 3 to 16 hp. A number of views in the plant of the company showing these engines at different stages of manufacture are included.

Wood and Metal Working Machinery.—W. F. & John Barnes Company, Rockford, Ill. Two catalogues. No. 67 describes a line of woodworking machinery, while No. 70 shows the Barnes upright drill and other machine tools. Among the machines illustrated in the latter catalogue is the No. 3 horizontal radial drill, an illustrated description of which appeared in *The Iron Age* December 23, 1909.

Gasoline Engine.—J. Thompson & Sons Mfg. Company, Beloit, Wis. Folder. Concerned with the Thompson air cooled gasoline engine, which is mounted on skids that also support the gasoline tank and the spark coil and battery. This gives the advantage of portability.

Automatic Metal Polishing Machines.—The Robinson Machine Company, Russell street and Milwaukee avenue, Detroit, Mich. Catalogue. Illustrated. Calls attention to the use of automatic polishing machinery for the finishing of brass tubing or flat surface work as well as special machines for manufacturers of safes and gas tanks for automobiles. Data on the efficiency and economy of these machines are included.

Hot Metal Working Machinery.—The Ajax Mfg. Company, Cleveland, Ohio. Catalogue. Size 6½ x 9⅝ in.; pages 96. Illustrates and describes the various lines of machines made by this company, together with the product manufactured by them. Among the machines covered is a high speed stop motion bulldozer which was illustrated in *The Iron Age* September 10, 1908. A number of tables are included which make the catalogue valuable as a reference book.

Steel Valves and Fittings.—Crane Company, Chicago, Ill. Special steel catalogue No. 70. Treats of a line of cast steel valves and fittings which are especially adapted for high pressure, saturated and superheated steam lines and extreme hydraulic service. All the fittings are illustrated and a number of dimension tables are included.

Engines and Boilers.—Clark Engine & Boiler Company, Kalamazoo, Mich. Catalogue J. Size 5⅛ x 8 in.; pages 58. This catalogue supersedes all former issues and describes and illustrates a line of horizontal, vertical, stationary and portable engines and boilers, tanks, stacks and all kinds of sheet iron work and castings. Repair parts for the various engines are illustrated and priced and a telegraph code completes the catalogue.

Hoisting Machinery.—J. G. Speidel, Reading, Pa. Catalogue A. Relates to a line of hoisting machinery which includes chain hoists, trolley tramways, traveling cranes and cellar hoists. All of the machines are illustrated and described at some length.

Railroad Car Movers.—G. G. Rowell & Son, 891 Union street, Appleton, Wis. Catalogue. Deals with the Rowell and the Samson railroad car movers, which are said to be so constructed that when the cam which moves the car is brought in contact with the wheel it forces the latter to revolve instead of lifting it from the track.

Testing Sets and Precision Lathes.—Frederick Pearce Company, 18 Rose street, New York City. Catalogue No. 500A and pamphlet. Illustrations and descriptive matter in the former explain the use of two distinct types of portable testing sets in which the resistances are controlled by plugs and switches, respectively. The precision lathe described in the pamphlet was designed to fill the gap formerly existing between the small watchmakers' tool and the small bench lathe.

Electric Vehicles. — The Lamsden Company, 54 Lackawanna avenue, Newark, N. J. Bulletin. Pertains to a line of electric storage battery wagons and trucks and small industrial trucks. An illustrated description of the last appeared in *The Iron Age* April 7, 1910.

Fire Protection Apparatus.—American-La France Fire Engine Company, Elmira, N. Y. Pamphlet entitled "The Story of the Chemical Fire Engine." Traces the development of chemical fire extinguishers from the small hand machines employing sulphuric acid and bicarbonate of soda, which were introduced nearly 50 years ago, to the present standard two and four wheeled chemical engines. The various types of engines are illustrated with brief specifications and there is a table showing the number of engines in service in the larger American cities, the length of service and the percentage of fires extinguished by them.

Blowers. — Schutte & Koerting Company, Twelfth and Thompson streets, Philadelphia, Pa. Catalogue 4, section A. Describes and illustrates the Koerting jet blowers for forcing air and gas by the use of a steam jet.

Solid and Inserted Tooth Circular and Band Saws.—The Buckeye, Saw Mfg. Company, 285 North Water street, Columbus, Ohio. Pamphlet. Illustrates a very complete line of all kinds of saws and sawmakers' tools, hand cut files and hack saws. Tables of prices and dimensions are given of the various appliances illustrated and considerable space is given to instructions on the use and maintenance of saws.

Sprocket and Traction Wheels.—Lehigh Car, Wheel & Axle Works, Catasauqua, Pa. Pamphlet. Pertains to the Fuller face hardened sprocket and traction wheels. The advantages of the face hardening are discussed and there is a complete price-list of the various types of wheels. Space is also given to the sprocket clutches made by this concern.

Cutter Grinders.—The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio. Catalogue. Size 6 x 9 in.; pages 70. This is the company's latest catalogue describing and illustrating the operation of the LeBlond cutter and tool grinder, which was illustrated in *The Iron Age* June 4, 1908. In addition to the illustrations, descriptions and brief specifications of the machines, space is given to remarks on grinding, the use of emery wheels and the operation and care of the grinder. The illustrations of the various kinds of grinding done by this machine give only a limited idea of its range and capacity.

Babbitt Metal.—Magnolia Metal Company, 115 Bank street, New York City. Pamphlet. Gives briefly the advantages of the Magnolia metal, with the results of tests made on Magnolia and genuine Babbitt metal.

Self-Lifting Elevators.—The Self-Lifting Elevator Company, Lima, Ohio. Folder. Describes a type of elevator for mills, stores and residences in which the person using it lifts himself without any appreciable effort.

Power Pumps.—The Deming Company, Salem, Ohio. Catalogue H. Size 6¾ x 9¼ in.; pages 189. Describes and illustrates the Deming line of triplex power pumps, complete well working heads and cylinders for operation by any power and under all conditions of operation. In addition to the illustrations and descriptions of the pumps themselves, the general construction of the triplex pump, which embodies the principle of the three-throw crank shaft, is illustrated and described, as well as the various types of drives for these pumps. In the latter part of the catalogue there are a number of illustrations of representative installations of the Deming power pump and a number of tables of useful information complete the catalogue.

Wireless Clusters and Lighting Specialties.—Benjamin Electric Mfg. Company, Chicago, Ill. Catalogue B-19. Size 6 x 9 in.; pages 79. Divided into four sections dealing with wireless clusters and cluster fixtures, special fixtures, lighting specialties and fixture accessories. In each section there are illustrations of the devices, with the code word and price.

Recording Gauges and Thermometers. — Industrial Instrument Company, Foxboro, Mass. Two bulletins. No. 38 describes recording gauges for automatically and continuously registering in ink on a paper chart the pressure of steam, gas, water or air. An important feature is the large effective working scale of the chart, thus securing close readings of pressure fluctuations. In bulletin No. 39, dial type thermometers for temperatures ranging from 50 to 500 degrees F. are described. The readings do not depend on the relative expansion of metals or on mercury, but upon the pressure exerted on the vapor of an inclosed liquid, which is dependent on the temperature. The thermometers are made either with a threaded stem or with a flexible tube, the latter allowing the body whose temperature is required to be placed some distance away.

Arch Plates, Door Jambs and Grates.—Pupkin & Rose Construction Company, 103 Park avenue, New York City. Pamphlet. The maker claims a fuel saving of 5 to 15 per cent. with its improved arch plates and door jambs over those generally installed under boilers. The important feature of the plates is

that they deliver air to the top of the grate. They are of cast iron with the upper one perforated with ⅜ to ⅝ in. holes over the door openings, besides holes in the face of the plate fronting the fire. The door jambs are of heavy cast iron construction, corrugated on the outside and perforated so that air can circulate between the casting and the brick slabs. With this jamb, burnt out fire bricks may be easily removed, as it is not necessary to shut down the boiler or employ a mason. The fire is only banked, the burnt tiles slipped out and new ones inserted. In the improved grate, bars supporting ribs are placed longitudinally under the web containing V-shaped openings and set in from the outer edges of the web.

Transformers.—Duncan Electric Mfg. Company, Lafayette, Ind. Bulletin No. 11. Describes and illustrates the construction and the various parts of Duncan transformers. Several pages are devoted to transformer testing. Diagrams of connections and dimensions of Duncan transformers ranging in size from 0.5 to 50 kw. are given.

Band Saw.—P. Pryibil, 512 West Forty-first street, New York City. Loose leaf catalogue. Gives general description and specifications for a special patternmakers' band saw, in which all adjustments are absolutely controlled and both wheels and the entire blade have been encased to safeguard the operator.

Water Works Appliances. — The Coldwell-Wilcox Company, Newburgh, N. Y. Loose leaf catalogue. Devoted to a general line of water works appliances, a portion of which is illustrated. In addition to the lines covered by the catalogue the company manufactures many types of special sluice gates and water works appliances, which can be furnished if desired.

Steam and Oil Separators.—Austin Separator Company, 55 Woodbridge street, Detroit, Mich. Catalogue No. 16. Calls attention to the standard receiver and accumulator types of steam and oil separators for the elimination of water from live steam, extracting oil and impurities from exhaust steam and separating oil, grit and moisture from compressed air, gas, &c., and vacuum separators for jet and surface condensers.

Pneumatic Forge Hammers.—Nazel Engineering & Machine Works, 4041 North Fifth street, Philadelphia, Pa. Illustrates and describes the Bêché patent pneumatic forge hammer, which this firm has the sole right to manufacture in the United States and Canada. Brief specifications of the hammer are given as well as a diagram showing the momentary resting of the ram after a blow has been struck, which is a special feature.

Combustion Recorder.—Precision Instrument Company, 49 Larned street, W., Detroit, Mich. Catalogue D. Treats of the Precision Simmance-Abady patent combustion recorder that records the percentage of carbon dioxide in the combustion of coal, which is the ultimate guide to the perfection of stoking, damper control and the condition of the boiler settings. The various styles of recorder are illustrated, together with specimen charts produced by it.

Gasoline Engines and Windmills. — The Challenge Company, Batavia, Ill. Catalogue No. 54. Size 6 x 9 in.; pages 224. Gives general description and specifications for a full line of gasoline engines and windmills in both steel and wood, steel and wood tanks, feed grinders, wood saws, pumps, cylinders, &c., steel substructures and water works supplies. All of the various lines are illustrated, and tables and an illustrated list of repair parts are included.

Water Columns.—The Reliance Gauge Column Company, Cleveland, Ohio. Circular. Devoted to the Reliance safety water columns, which are made in both the low and the combined high and low water alarm types.

Wood Pulleys.—Dodge Mfg. Company, Mishawaka, Ind. Booklet, entitled "Five and One-Half Miles per Minute." Describes a test recently conducted with a Dodge iron spider wood rim pulley. This pulley was 46½ in. in diameter, with a 16-in. face and a 4-in. bore. It was exact duplicate of one supplied a customer for a rim travel of 9000 ft. per min., and during the test the speed was slightly in excess of 2400 rev. per min., which gave a rim travel of 29,200 ft.

Gas Producers and Engines.—J. Thompson & Sons Mfg. Company, Beloit, Wis. Two bulletins. No. 26 relates to the Thompson suction gas producers of the water seal type, which are designed for continuous operation. In addition to the specifications for this producer, space is also given to a general description of gas producers and their uses. In bulletin No. 28 illustrations and descriptive matter explain the operation of the Thompson automatic tandem gas engine.

Special Woodworking Machinery.—Trevor Mfg. Company, Lockport, N. Y. Two catalogues. The first, A, deals with a line of machinery for making shingles, barrel heads, flat barrel staves and for cutting veneers and thin stock generally for baskets, boxes and crates for shipping fruit and vegetables. B pertains to a line of machinery for turning long wooden handles of various kinds and preparing the stock from the log, as well as special lathes for turning yacht spars, flag poles, oars, canoe paddles, &c. In both catalogues the full line of machinery is illustrated and brief specifications are given.

Motor Cars Supplies.—The Motor Car Supply Company, 1451 Michigan avenue, Chicago, Ill. Catalogue No. 18. Size 6⅝ x 8¾ in.; pages 342. Pertains to a very complete line of supplies of all kinds for motor cars. Practically all the accessories are illustrated and priced. A complete index renders the finding of any particular article comparatively simple.

Corliss Engines.—The Griffith & Wedge Company, Zanesville, Ohio. Folder. Illustrates the heavy duty Ohio Corliss engine and contains a table of the sizes and indicated horsepower.

Portable Mold Dryer.—Hanna Engineering Works, 2059 Elston avenue, Chicago, Ill. Pamphlet. Describes and illustrates the Hanna portable mold dryer, which it is claimed will dry any mold regardless of size or shape perfectly. The application of these at successive stages to a large gas engine bed is described at length and the text is supplemented by a number of illustrations.

Water Softener.—The Dearborn Drug & Chemical Works, McCormick Building, Chicago, Ill. Booklet, entitled "Treatment of Boiler Feed Waters." Covers the whole problem of treating boiler feed waters and shows a number of boiler tubes that have been corroded both externally and internally.

Wire Rope.—A. Leschen & Sons Rope Company, 920 North First street, St. Louis, Mo. Pamphlet. Its purpose is to provide as far as practicable a means for quickly selecting the quality and construction of wire rope best suited for various kinds of service. With this end in view the construction of the various types of wire rope is described, and this is followed by illustrations of them.

Dynamometer.—Joseph Tracy, 116 West Thirty-ninth street, New York City. Booklet. Concerned with a fan dynamometer, that has been especially designed for the absorption and measurement of the power developed by internal combustion motors. *The Iron Age*, November 24, 1910, contained an illustrated description of this dynamometer.

Air Compressors.—The Sullivan Machinery Company, 150 Michigan avenue, Chicago, Ill. Two bulletins. No. 58 H contains an illustrated description of the small steam driven Sullivan air compressors, classes WA-3 and WA-4. No. 58 I gives descriptions of accessories, such as air reheaters, receivers and unloading devices used in connection with the Sullivan air compressors, and to these have been added a number of tables and a collection of miscellaneous data on the subject of compressed air and its applications.

Engines and Boilers.—Nagle Engine & Boiler Works, Erie, Pa. Catalogue No. 70. Size 6½ x 9 in.; pages 92. Lists the various sizes and styles of engines and boilers for all classes of service built by the company.

Special Track Work, Castings and Vises.—Barbour-Stockwell Company, 205 Broadway, Cambridgeport, Mass. Two loose leaf catalogues and a pamphlet. The first is devoted to special track work for street railroads and shows switches, frogs, crossings, switch targets, tie plates and track drains. The second calls attention to a line of miscellaneous and sewer castings, and the pamphlet illustrates and describes the Chandler and Washburn patent quick action vises.

Grain Elevator Supplies and Equipments. — Union Iron Works, 620 William street, Decatur, Ill. Catalogue No. 26. Size 6 x 9 in.; pages 270. Lists an extensive line of grain elevator equipment and supplies, which includes corn shelling and cleaning machinery and elevating, conveying and power transmitting machinery. All of the various appliances are illustrated and brief specifications and dimension tables are included.

Woodworking Machinery.—The Oliver Machinery Company, Grand Rapids, Mich. Several catalogues. These list various woodworking machines, such as universal saw benches, variety saw tables, swing cut-off saws, lathes, a motor driven speed lathe, a circular safety planer cylinder, a belt driven speed lathe and a number of different band saws and wood trimmers.

Motor Driven Elevators.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Section No. 3103 of perpetual catalogue No. 3002-A. Devoted to the subject of motor driven elevators and contains a number of illustrations of typical installations.

Gas and Gasoline Engines.—Seager Engine Works, Lansing, Mich. Three bulletins. No. 27-A is concerned with the Olds power pump, No. 35 relates to a self-contained 1½-hp. gas engine, and No. 37 illustrates another 1½-hp. engine connected to operate a standard contractors' diaphragm pumping outfit.

Pneumatic Tools.—The Empire Engine & Motor Company, Orangeburg, N. Y. Catalogue No. 2. Size 6 x 9 in.; pages 63. Relates to the Empire line of air tools, which includes pneumatic motor chain hoists, drills, reamers, center grinders, crane motors, portable winches, hoisting engines, &c. All of these are illustrated and brief specifications are given on the facing pages.

Hammers and Forges.—C. C. Bradley & Son, Syracuse, N. Y. Several circulars. Deal with a line of hammers and forges of various styles. The forges burn either hard coal or coke and are intended to bring iron and steel to the proper forging heat. The hammers include a rubber cushioned helve hammer, an upright strap hammer and a compact hammer, the special advantage of which is the small amount of floor space required.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅜ in. round and square; 1½ to 4 in. x ⅜ to 1 in.; 1½ to 4 in. x ¼ to 5-1 ..... ₩ lb 1.75¢

Rods—⅜ and 11-16 round and square ..... ₩ lb 1.85¢

Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.00¢
3 in. x 3-16 in. and ⅛ in.	2.25¢
1½ to 2½ in. x ¼ in.	2.10¢
1½ to 2½ in. x 3-16 in. and thicker	2.00¢
1 to 1¼ in. x 3-16 in.	2.10¢
1 to 1¼ x ⅛ in.	2.20¢
¾ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ⅛ in.	3.45¢
½ x 3-32 in.	4.25¢
Tees:	
1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.35¢
3 in. and larger	2.05¢
Beams	2.00¢
Channels, 3 in. and larger	2.00¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black	One Pass, C.R Soft Steel.	B. G. Cleaned.
No. 16	₩ lb 2.55¢	2.80¢
Nos. 18 to 20	₩ lb 2.70¢	2.90¢
Nos. 22 and 24	₩ lb 2.75¢	3.00¢
No. 26	₩ lb 2.85¢	3.10¢
No. 28	₩ lb 2.95¢	3.30¢

Russia, Planished, &c.

Genuine Russia, according to assortment ..... ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 12 and 14	₩ lb 2.95¢
Nos. 22 to 24	₩ lb 3.30¢
No. 26	₩ lb 3.50¢
No. 28	₩ lb 3.80¢

No. 20 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24	₩ 100 sq. ft. $3.85	4.40
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A. Charcoal:	
IC, 14 x 20	5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20	107 lb	$4.40
IX, 14 x 20		5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.50
IX, 20 x 28 with an 8 lb. coating	10.50

Seamless Brass Tubes—

List November 15, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 21¢

Brazed Brass Tubes—

List August 1, 1908. 19⅝¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14¾¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14¾¢ ₩ lb

Brass Wire—

List August 1, 1908. 14¾¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 14¼¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 13 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ..... ₩ lb 40¼@40¾¢

Copper—

Lake Ingot	₩ lb 14⅝@15 ¢
Electrolytic	₩ lb 14⅜@14⅝¢
Casting	₩ lb 14¼@14⅜¢

Spelter—

Western ..... ₩ lb 6¼@6⅜¢

Zinc.

No 9, base, casks ..... ₩ lb 8¼¢ | Open ..... ₩ lb 8⅝¢

Lead.

American Pig	₩ lb 5 @5¼¢
Bar	₩ lb 6¾@6⅞¢

Solder.

½ & ½, guaranteed	₩ lb 23½@24 ¢
No. 1	₩ lb 21½@22 ¢
Refined	₩ lb 19 @19¼¢

Prices o Solder indicated by private brand vary according to compo.ition.

Antimony—

Cookson	₩ lb @10¢
Hallett's	@10¢
Other Brands	@9½¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting ..... 31¢

Rods & Wire ..... Base Price 31¢

Sheets ..... Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 11.00@11.25
Copper, Heavy and Wire	₩ lb 10.75@11.00
Copper, Light and Bottoms	₩ lb 9.75@10.00
Brass, Heavy	₩ lb 7.25@ 7.50
Brass, Light	₩ lb 5.75@ 6.00
Heavy Mechine Composition	₩ lb 9.75@10.00
Clean Brass Turnings	₩ lb 7.25@ 7.50
Composition Turnings	₩ lb 8.25@ 8.50
Lead, Heavy	₩ lb @ 3.75
Lead, Tea	₩ lb @ 3.50
Zinc Scrap	₩ lb @ 4.00

Mill and Machinists' Supplies

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in Roman relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

Anvils—American—

Eagle Anvils.....₱ lb @9 ¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton.....₱ lb 9½@9¾¢

Imported—

Swedish Solid Steel Paragon, ₱ lb.....9½@9¾¢
Peter Wright & Sons, ₱ lb., 84 to 349 lb., 10½¢; 350 to 600 lb., 11¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Axles—

	Iron or Steel.
Concord, Loose Collar	4¼@4½¢
Concord, Solid Collar	4½&5 ¢
No. 1 Common, Loose	3½@4 ¢
No. 1½ Com., New Style	4¼@4¾¢
No. 2, Solid Collar	4¼@4¾¢
Half Patent:	
Nos. 7, 8, 11 and 12	70%
Nos. 13 to 14	70%
Nos. 15 to 18	70&10@70&10&5%
Nos. 19 to 22	70&10@70&10&5%

Boxes, Axle—

Common and Concord, not turned.....lb.,5@6¢
Common and Concord, turned.....lb.,6@7¢
Half Patent.....lb.,9½@10¢

Bars— Crow—

Stee Crowbars, 10 to 40 lb......per lb., 3@3¼¢

Prying and Pinch—

Elmore Tool Mfg. Co.....75%

Bellows—

Blacksmith, Standard List:
Split Leather.....65%
Grain Leather.....65%

Hand—

Inch...	*6*	*7*	*8*	*10*
Doz....	*$4.00*	*4.35*	*4.90*	*6.55*

Molders—

Inch...	*10*	*12*	*14*	*16*
Doz....	*$7.10*	*9.60*	*12.35*	*16.90*

Net Prices

Belting— Leather—

Extra Heavy, Single and Double..55%
Heavy, Single and Double.....60%
Medium, Single and Double..60&10%
Light, Single and Double, 60&10&10%
Shoulder, Single and Double.....75%
Standard.....70&10%
Cut Leather Lacing, Strictly No. 1.....45%
Leather Lacing Sides, per sq. ft. Raw Hide, No. 1, in sides 17 sq. ft. and over, 27¢; No. 2, under 17 sq. ft......27¢.

Rubber—

Competition (Low Grade).....60&10%
Standard.....40&10%
Best Grades.....40%

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%

Blocks— Tackle—

Common Wooden.....75&10@80%
Lane's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Bolts—Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller.....70&7½%
Larger and longer.....65&5%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter, 70&12½%
Phila. Eagle, $3.00 list, 80&5@80&10%
Bolt Ends, with C. & T. Nuts..65&5%
Machine (Cut Thread):
⅜ x 4 and smaller.....70&12½%
Larger and longer.....65&10%

Bolts—Expansion—

F. H. Evans' Crescent.....40@60%
Richards Mfg. Co.....60&10%
Star Expansion Bolt Co.:
Star Lag Screw Type.....66⅔%
Star, and Sebco, Wood Screw Type.60%
Star, Machine, Single.....60&10%
Star, Machine, Double.....60&10%
Star Toggle Bolts.....60&10%
A. C. Seaman's Positive.....60&10%
Steward & Romaine Mfg. Co.:
Style No. 13, Double.....60&10%
Style No. 1, Single.....60&10%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw.....66⅔%
Star Screw Anchors, Hollow.....40%

Plow and Stove—

Plow.....65&5@70%
Stove.....85&10%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84..82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84....80%
Eagle.....82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99...80%
Phila., Eagle, list Oct. 16, 1884.82½%
Upson Nut Co.:
Tire Bolts.....75&10&5%

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb., $3.80@$4.00
Sharp, 1 prong, per 100 lb., $4.30@$4.50
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¾¢; Sharp Heel.....4¾¢
Perkins', Blunt, ₱ lb., 3.65¢; Sharp, 4.15¢

Chain, Proof Coil—

Small lots:

American Coil, Straight Link.						
3-16	*¼*	*5-16*	*⅜*	*7-16*	*½&9-16*	*⅝*
$8.25	*5.65*	*4.90*	*4.20*	*3.85*	*3.60*	*3.50*
¾	*⅞*	*1*	*1 1-16 to 1¼*			
$3.40	*3.30*	*3.20*	*3.30*			

German Coil.....70&5%
German Pattern Coil:
6-0 to 1.....70&10&5%
2 and 3.....60&10&10@70%
4, 5 and 6.....50&10@50&10&5%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$26.00
6½—6-2, Straight, with ring..$27.00
6½—8-2, Straight, with ring..$30.00
6½—10-2, Straight, with ring..$35.00
NOTE.—Add 2¢ per pair for Hooks Twist Traces add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to prices of Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....70&10@—%

Miscellaneous—

Jack Chain:
Iron..50&10&10@50&10&10&5%
Brass.....60&10@60&10&5%
Safety and Plumbers' Chain, 70&10@70&10&10%

Chests, Tool—

American Tool Chest Co.:
Farmers', Carpenters', etc., Chests, with Tools.....20%
Tool Cabinets, with tools.....45%
Machinists' and Pipe Fitters' Chests, Empty.....45%
Steel Tools Chests, Empty.....20%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—Cold—

	lb.
Cold Chisels, good quality	13@15¢
Cold Chisels, fair quality	11@12¢
Cold Chisels, ordinary	9@10¢

Elmore Tool Mfg. Co.:
English Tool Steel.....50&5%

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck..40%
Beach Pat. each $8.00.....35&5%
Jacobs' Drill Chucks.....30%
Skinner Lathe Chucks:
Independent.....35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....40%
Combination, Reversible Jaws..35%
Combination, Com. Style Jaws..40%
Round Body or Box Body, 2 Chuck Jaws.....25%
Geared Scroll Chucks.....25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent...25%
Positive Drive.....40%
Planer Chucks.....20%
Standard.....45%
Drill Press Vise.....30%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....40%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; Nos. 21 and 24.35%
Scroll Combinations, Nos. 83 and 84.....30%
Geared Scroll, Nos. 79 80 and 81..25%
Independent Iron, Nos. 118, 19, 318 and 96.....35%
Independent Steel, No. 64.....25%
Union Drill.....30%
Union Czar Drill.....30%
Universal, Nos. 21 and 42.....35%
Iron Face Plate Jaws, Nos. 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Carriage Makers', Star, P., S. & W. Co.....50%
Besly, Parallel.....33⅓&10%
Hammer & Co.:
Adjustable.....20&5%
Carriage Makers' H. P. Screw 40&5%
Myers', Standard and Wenzelmann Hay Rack.....50%

Clips, Axle—

Regular Styles.....80&80&10%

Compasses, Dividers, &c.

Ordinary Goods.....75@75&5%

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 21¢; lighter than 3 lb. to pair.....23¢

Crayons—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ₱ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.00; 5 in. x ¼ in. Square, $1.50; 5 x ½ x 3-16, $1.75; 5 x 1⅛ x 3-16.....$2.50
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines.....$1.50@1.75
Breast, Millers Falls.....15&10%
Breast, P. S. & W.....30&10%
C. & C. Reversible Ratchet Die Stocks.....25%
Forbes Die Stocks.....5%
Goodell Automatic Drills.....50&10@60&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills ₱ doz. Nos. 3 & 5, $8.16; 4 & 7, $9.33.6, $9.90
Noyes Repair Shop Drill No. 10...20%
Ratchet, Parker's.....40%
Ratchet, Weston's, Styles A and B.50%
Ratchet, Weston's, Styles C, D and F.....45%
Ratchet, Weston's, Style H Improved.....45%
Ratchet, "Celebrated 012".....50%
Ratchet, Whitney's, P., S. & W. 50@50&5%
Star Drills.....60%
Star Pipe Drills.....50&10%
Sebco Extension Drills.....40&10&5%
Star Drill Holders.....50&10&10%
Star Drill Points.....50&10&10%

Twist Drills—

Bit Stock.....70@70&5%
Taper and Straight Shank..60&5@65%

Emery, Turkish—

		4 to 4&6:	*5 to 20:*	*Flour.*
Kegs	*lb.*	*5 ¢*	*5½¢*	*5½¢*
½ Kegs	*lb.*	*5¼¢*	*5¾¢*	*5¾¢*
¼ Kegs	*lb.*	*5½¢*	*6 ¢*	*6 ¢*
10-lb. cans, 10 in case		*6½¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10		*10 ¢*	*10 ¢*	*8 ¢*
Less quantity		*10 ¢*	*10 ¢*	*8 ¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Files— Domestic—

Best Brands.....70&10@75&10%
Standard Brands....75&10@80&5%
Lower Grade....75&10&10@80&10%
American.....75&10%
Arcade.....75&10%
Black Diamond.....70&10%
Delta Brand.....70%
Disston's Superfine.....60%
Eagle.....75&10%
Fitchburg.....75&10%
Great Western.....75&10%
Heller Bros.....70&10@75&10%
Kearney & Foot.....75&10%
Liveright Bros., Gold Medal.....70%
McClellan.....75&10%
Nicholson.....70&10%
Simonds.....70%
J. Barton Smith.....75&10%
X-F Swiss Pattern.....40&10%

Fixtures, Fire Door—

Richards Mfg. Co.:
No. 102, Monarch A; No. 201, Mutual.....50&10%
Universal, No. 103; Special, No. 104.....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107....60&10%

Grindstone—

Net Prices;

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.00*	*3.25*	*3.55*	*4.00*

Peck, Stow & Wilcox Co.:

In.	15	17	19	21	24	
	$4.00	4.40	4.75	5.50	6.50	20%

Reading Hardware Co.....50&10%

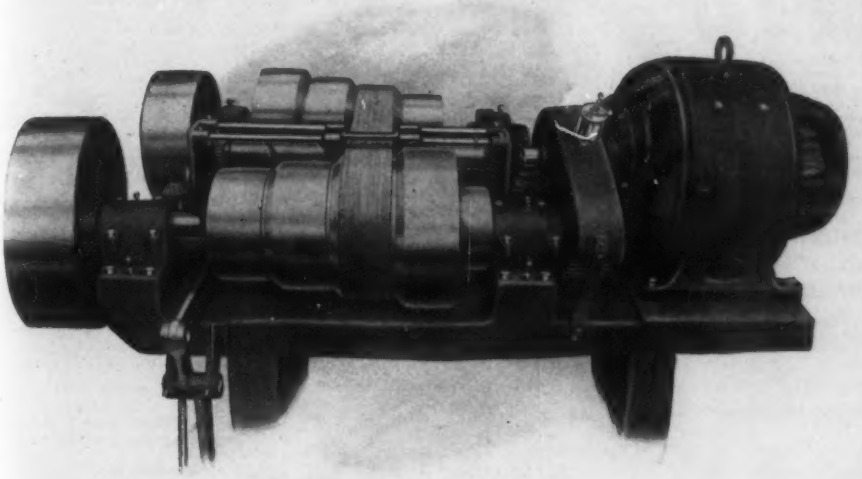
Gauges—

Marking, Mortise, &c...50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c....50&50&10%
Disston's Marking, Mortise, &c.60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P. S. & W. Co.....25%

Grinders—

Pike Mfg. Co.:
Enclosed Gear Machines: Power, Senior, Junior and Midget.....33⅓%
Chain Driven Machines: Nos. 1, 2, 3 and Pyke Field Grinder 33⅓; Pyke Spiral (Foot Power).....33⅓%
Redlinger & Angle Mfg. Co.:
Climax Steel Frame Emery Grinder, No. 5.....$7.80
Star Wooden Frame Emery Grinder, $5.00

The "AMERICAN" Patented 4-Step Cone Planer Speed Variator



4-STEP CONE PLANER SPEED VARIATOR.

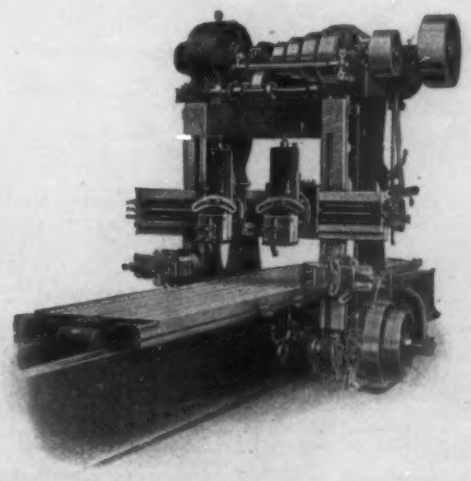
Is Free From

Gears, Frictions, Jaw-Clutches, and such troublesome devices as used in other types of Planer Speed Variators.

It affords a smooth, quiet drive, and the work produced is free from gear marks and imperfections.

4 Cutting Speeds are obtained through a pair of Opposed 4-Step Cones mounted on a substantial platform on top of the housings. Each speed is instantly available while the machine is running at Top Speed by merely shifting the connecting belt from step to step by rotating the hand wheel shown on planer cut. The edges of the steps are beveled to facilitate the shifting of the belt.

Guaranteed to plane true to within .001 part of an inch.



Belt or Motor Drive.

The possibilities for economical production on "American" Multi-Speed Planers are very evident.

Metals of different degrees of hardness can be planed with a favorable cutting speed for each one.

Before installing your next Planer, let us tell you more about this New "AMERICAN." This is a machine well worth your investigation and should be of interest to you.

THE AMERICAN TOOL WORKS CO.

200 to 250 Culvert St. **Cincinnati** **U. S. A.**

Lathes - Planers - Shapers - Radials

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Ell and Cyclo. Ball Bearing, mounted.....40%

Hammers—

Heavy Hammers and Sledges—

3 to 5 lb., 30¢.....80&5@80&10%
Over 5 lb., 30¢.80&10&5@80&10&10%

Jacks—

Wagon—

Covert Mfg. Co.:
Auto Screw.....30&10%; Steel 50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130..50&10%

Machines—

Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r without Augers, $2.25@2.50

Ford Auger Bit Co.....$22.00
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....$5.75
Snell's, Upright, $2.65; Angular..$2.90
Swan's Improved.....40&10%

Forming, Bending, Etc.—

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $15.00.....40%

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Nails—

Wire Nails and Brads, Miscellaneous.....85@10%
Cut and Wire. See Trade Report.

Horse—

Jobbers' Special Brands, per lb.....9¢

Nuts—

Blank or Tapped—

	Off list.
Cold Punched:	
Square	*4.90¢*
Hexagon	*5.50¢*
Square, C., T. & R.	*5.30¢*
Hexagon, C., T. & R.	*6.10¢*
Hot Pressed:	*Off list.*
Square	*5.40¢*
Hexagon	*5.80¢*

Oakum—

In 50-lb. Bales.

Best.....lb. 6¼¢
U. S. Navy.....lb. 5¾¢
Navy.....lb. 5 ¢
Plumbers' Spun Oakum.....lb. 2½¢

Oilers—

Steel, Copper Plated.....75&10%
Chase or Paragon:
Brass and Copper.....45&50%
Zinc.....75%
Railroad.....60&10&10%
American Tube & Stamping Co.:
Spring Bottom Cans....70@70&10%
Railroad Oilers, &c.....60@60&10%
Hero Mfg. Co.:
Spring Bottom Cans....70@70&10%
Railroad Oilers, &c.....60@60&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.

Packing—

Asbestos Packing, Wick and Rope, any quantity.....13¢

Rubber—

(Fair quality goods.)

Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ₱ lb, $1.00.....20&10%

Miscellaneous—

American Packing.....lb. 9@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@10 ¢
Jute.....lb. 3¼@3½¢
Russia Packing.....lb. 9@10 ¢

Picks and Mattocks—

List.....70&10%

Pipe, Vitrified Sewer—

Standard Pipe and Fittings, 3 to 24 in., Carload lots f.o.b. factory:
First-class.....86%
Second-class.....83%

Plates—

Felloe.....lb, 3¼@4¢
Avery Stamping Co.:
Standard Wrot. Steel Felloe Plate in 100 lb kegs, per 100 lb, ⅝-in. to 1⅛-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Pliers and Nippers—

Button Pliers.....75&5@75&10 %
Gas Burner, per doz., 5 in., $1.25 @$1.50; 6 in., $1.45; $1.50.

Gas Pipe..	*7*	*8*	*10*	*12-in.*
	$2.00	*$2.25*	*$2.75*	*$3.50*

Acme Nippers.....50%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's.....60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Elmore Tool Mfg. Co.:
Gas Pliers.....70%
Wire and Cutting Pliers.....75%
Heller's Farriers' Nippers, Pincers and Tools.....40@40&10%
P. S. & W. Pliers.....40&10%
P. S. & W. Tinners' Cutting Nippers.....25%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds....40%

Rasps, Horse—

Disston's.....75%
Heller Bros.'.....20&5@70&10&5%
Liveright Bros.' Gold Medal.....70%
McCaffrey's American Standard.....60&10&5%
Nicholson.....70&10@75%
See also Files.

Riddles, Hardware Grade

16 in.....per doz. $2.50@$2.75
17 in.....per doz. $2.75@$3.00
18 in.....per doz. $3.00@$3.25

Rivets—

Copper Rivets and Burrs..50&10&5%
Tinners' and Miscellaneous Rivets.....75&10@80%
Structural, base, ¾-in. and larger.....$2.25@$2.30
Boiler, cone head, ¾-in. and larger.....$2.35@$2.40

Bifurcated and Tubular—

Assorted in Pasteboard Boxes.

Bifurcated, per dozen boxes, 50 count, 40@45¢; 100 count, 50@63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

Rope—*Per Pound.*

Eastern Retail Trade
Manila, 7-16 in. diam. and larger:
Highest Grade.....9@9½¢
Second Grade.....8½@9¢
Hardware Grade.....8@8½¢
Sisal, 7-16 in. diam. and larger:
Highest Grade.....7½@7½¢
Second Grade.....6¼@6¾¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Pure.....7½@8¢
Sisal, Tarred, Medium Lath Yarn:
Pure.....6½@7¢
Cotton Rope:
Best, ¼-in. and larger.....20@22¢
Medium, ¼-in. and larger....18½¢
Common, ¼-in. and larger.....10¢
In coils, ½¢ advance.
Jute Rope:
Rove, ¼-in. and up.
No. 1, 6½@7; No. 2, 5½@6¢

Wire Rope—

Galvanized.....42½&2½%
Plain.....50&2½%

Rules—

Boxwood.....60&5%
Ivory.....25&5%
Chapin-Stephens Co.:
Boxwood.....60%
Flexifold.....40%
Ivory.....25@25&10%
Miscellaneous.....50@50&10%
Stephens' Combination.....55%
Stationers'.....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood.....60&5%

Scales—

Union Platform, Plain..$2.10@$2.20
Union Platform, Stpd.....$2.20@2.30
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Reading Hardware Co.....50&5%
The Standard Portables.....40%
The Standard R. R. & Wagon..50&10%

Screws—

Coach and Lag—

Lag, Cone Point.....75&10%
Coach, Gimlet Point.....75&5%

Jack—

Standard List.....70&10%
Millers Falls.....50&10&10%

Machine—

Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head.....40@40&10%
Rolled Thread, F. H. or R. H., Iron.....75&10%
F. H. or R. H., Brass, Nos. 8 to 14.....65&10%

Set and Cap—

Set (Iron).....75&10&7½ %
Set (Steel), net advance over Iron .25%
Sq. Hd. Cap.....70&10&7½ %
Hex. Hd. Cap.....70&10&7½%
Rd. Hd. Cap.....50&7½%
Fillister Hd. Cap.....60&7½%

Wood—

List July 23, 1903.

Flat Head, Iron.....87½&5@..%
Round Head, Iron.....85&5@..%
Flat Head, Brass.....80&5@..%
Round Head, Brass.....77½&5@..%
Flat Head, Bronze.....75&5@..%
Round Head, Bronze...72½&5@..%
Drive Screws.....87½&5@..%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron.....per keg $4.10
Steel.....per keg $3.85

Shovels and Spades—

Association List....40&7½@40&10%
Avery Stamping Co.....40%

Sieves—

Seamless Metallic—

	Per Dozen.			
Mesh.....	*14*	*16*	*18*	*20*
Iron Wire..	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire.	*$1.15*	*1.15*	*1.20*	*1.30*

Wooden Rim—

Nested, 10, 11 and 12 Inch.

Mesh 18, Nested.....doz. $0.90@0.95
Mesh 20, Nested.....doz. $1.00@1.05
Mesh 24, Nested.....doz. $1.30@1.40

Skeins, Wagon—

Cast Iron.....70@70&10%
Steel.....35@40%

Springs—

Carriage, wagon, &c.—

1¼ in. and Wider:	*Per 100 lb.*
Black	*$4.75@$5.00*
Half Bright	*$4.75@$5.00*
Bright	*$5.25@$5.50*

Painted Seat Springs:
1½ x 2 x 26.....per pair .45@47¢
1½ x 3 x 28.....per pair .68@71¢

Stocks and Dies—

Blacksmiths'.....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plate.....25%

Tacks, Finishing Nails, &c.

American Carpet Tacks..90&20@—%
American Cut Tacks.....90&20@—%
Swedes' Cut Tacks.....90&20@—%
Swedes' Upholsterers'...90&30@—%
Gimp Tacks.....90&30@—%
Lace Tacks.....90&30@—%
Trimmers' Tacks.....90&20@—%
Looking Glass Tacks.....65@—%
Bill Posters' and Railroad Tacks, 90&10@—%
Hungarian Nails.....75&10@—%
Finishing Nails.....70@—%
Trunk and Clout Nails.....75@—%
NOTE.—The above prices are for Straight Weights.
See also Nails, Wire.

Double Pointed—

Double Pointed Tacks..... 90&10&10&10&2½%

Tapes, Measuring—

American Asses' Skin.....50@—%
Patent Leather.....25@30&5%
Steel.....33⅓&5%
Chesterman's.....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35& 35@5%; Pocket, 35@35&5%
Lufkin's:
Asses' Skin.....40&10@50%
Metallic.....30@30&5%
Patent Bend, Leather.25&5@25&10%
Pocket.....40@40&5%
Steel.....33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc.....25%
Chesterman's Steel, No. 1038L, etc.....35%

Trucks, Warehouse, &c.—

McKinney Trucks... ach, net $10.00

Vises

Solid Box.....55&5@60%

Parallel—

Fisher & Norris Double Screw ..., each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.....30%
Fisher-Brooks Bench and Wood-workers' Vises, No. 0, $3.50 No. 1, $6.30; No. 2, $8.50; No. 3 H, $18.75; No. 4, $25.00.....40%
Merrill's.....25%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars..20@25%
Vulcan's.....40@45%
Combination Pipe.....55@60%
Prentiss Vise Co.:
Patent, Bicycle, Shepard, Gipsy, Adj. Column, Lewis Adj. Jaw.25%
Rapid Transit, Heavy Chipping.30%
Bull Dog, Anchor Line, Yankee Quick Lever, Lewis Solid Jaw, Eclipse Wrench Attachment..40%
Monarch.....45%
Vise Jaw Caps.....10%
Pullman Automatic Bench, ₱ doz., No. 1, $7.50; No. 2.....39.50
Spitsli Mfg. Co.:
F. & R. Double Swivel.....30%
Star Parallel Machinist.....50%
Swivel Base Machinist.....50%
F. & R. Auto and Motor Boat..60%

Pipe—

Curtis & Curtis Malleable.....25%
Parker's Combination:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Washers—

Leather, Axle—

Solid.....85@85&10%
Patent.....85@85&10%

Coil:	*⅜*	*½*	*⅝*	*¾ inch.*
	9¢	*10¢*	*11¢*	*14¢ per box*

Iron or Steel—

Size bolt.....	*5-16*	*⅜*	*½*	*⅝*	*¾*
Washers....	*$5.20*	*4.90*	*3.00*	*2.80*	*2.80*

The above prices are based on $6.20 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ₱ 100 lb. discl.; in 100 lb kegs add 10¢ net ₱ 100 lb; in 5 or 10 lb boxes, add 50¢ net ₱ 100 lb; in 1 lb boxes, add $1.00 net ₱ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery.....75%

Wire—

Market and Stone Wire in Bundles—

Bright and Annealed:
9 and coarser.....80%
10 to 18.....80&10%
19 to 26.....80&10&2½%
27 to 36.....80&5%
Galvanized:
9 and coarser.....75&10%
10 to 16.....75&10%
17 to 26.....72½&10%
27 to 36.....72½%
Coppered:
9 and coarser.....75&10%
10 to 26.....75&10%
27 to 36.....70&10&5%
Tinned:
6 to 18.....75&10&10%
Brass.....13½¢ lb., base
Copper.....14¢ lb., base
Cast Steel Wire.....50%

Spooled Wire—

Annealed and Tinned.....70&10%
Brass and Copper.....60&10%
Retailers' Assortments, per box, $1.75@$2.50

Wrenches—

Agricultural.....75&10@80&5%
Alligator or Crocodile....70&10@75%
Bazier Pattern S Wrenches, 70&5@70&10%
Drop Forged S.....45@45&5%
Acme.....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable ₱ Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut.....50&10%
Combination Black.....50&10%
Merrick Pattern.....50&10%
Steel Handle Screw.....50&10%
Wood Handle Screw.....50&10%
Coes' Genuine Knife Hdl...50@50&10%
Coes' Genuine Steel Hdl...50@50&10%
Coes' Genuine Key Model..50@50&10%
Coes' Genuine Hammer Handle..... 50@50&10%
Coes' "Mechanics'" ..... 50&10@50&10&10%
Hercules.....70%
W. & B. M chinist:
Case lots.....50&10%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
P., S. & W. Solid Handles..50&10%:
full case lots.....50&10&5%
Ideal Knife Handle,....50&10&5%:
full case lots.....50&10&10%
Vulcan-Bijaw Chain Pipe.....50%
Agrippa Chain Pipe.....50@10%
Vulcan Chain Pipe.....50%
Wizard Adjustable Ratchet, doz. $15.00